

A revision of the genus *Belonogaster* de Saussure (Hymenoptera: Vespidae)



O. W. Richards

89 St Stephens Road, London W13 8JA

Contents

| | |
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| Synopsis | 31 |
| Introduction | 31 |
| Depositories | 32 |
| <i>Belonogaster</i> de Saussure | 33 |
| Key to species of <i>Belonogaster</i> (excluding Madagascar) | 33 |
| Females | 33 |
| Males | 40 |
| Key to Malagasy species of <i>Belonogaster</i> | 46 |
| Descriptions of African species | 47 |
| Descriptions of Malagasy species | 101 |
| References | 111 |
| Index | 113 |

Synopsis

This paper is a revision of the species of *Belonogaster*, a genus of social wasps which is almost confined to Africa and Madagascar, though a few species are found in Arabia and two extend as far as India. There has been no comprehensive paper on the group since du Buysson's monograph (1909), which has not been found to make identification of species very easy. There now seem to be 69 species of which 10 are confined to Madagascar and 31 are new; four of the species are each represented by two subspecies. Keys are provided to the species and subspecies. Twenty-eight lectotypes and seven specific synonyms are newly established.

Introduction

Belonogaster is a large, almost entirely African genus of social wasps whose taxonomy has been little studied since du Buysson's revision in 1909. Those who have tried to use du Buysson's keys for identifying their specimens find that they are unsatisfactory, partly, I think, because there are many more species than he recognized but also because their identification is unusually difficult. In my experience nearly all the characters, even those which seem quite diagnostic in most specimens, prove variable in others. Possibly additional material, particularly series known to be derived from single nests, would solve some of these problems, but at the moment not all identifications, especially of the females, can be made with complete confidence. This is especially the case if the characters of the pubescence and tomentum have been obscured by bad preservation. On the whole the males have more distinctive characters than the females, but they are also considerably rarer in collections, the ratio being about 1 : 5.

The genus is almost confined to Africa south of the Sahara where it is a highly characteristic member of the fauna (Bequaert, 1918: 230). A few species are established in Arabia and a few specimens, apparently strays, come from North Africa. One species, *B. indica*, seems to be peculiar to India, though specimens with a reliable Indian locality label do not seem to exist in European collections. Recently, the common African species, *B. juncea*, has also been found in India. There is a small, highly distinctive group of species in Madagascar. I believe these are all peculiar to that island, though it is just possible that one or two African species have been introduced (as indeed they have into England, though not in that case becoming established). The African fauna seems to consist of a few common species which are widely spread and a large

number which are at present known from a few, often only one or two specimens, as shown below.

| Number of specimens | Number of species or subspecies |
|---------------------|---------------------------------|
| 1 | 16 |
| 2-10 | 16 |
| 11-40 | 18 |
| 41-200 | 17 |
| 201-649 | 3 |
| 650-770 | 2 |

B. leonina is exceptional in being apparently generally rare, but quite common in a small area of the Republic of Congo. Species represented by a single specimen have only been described when the characters are unusually distinct.

The main basis of the present work was the very large collection (about 2000 specimens) of the British Museum (Natural History) which I was allowed to study owing to the kindness of Dr L. A. Mound. Dr S. Kelner-Pillault was good enough to allow me to study the collection in the Muséum national d'Histoire Naturelle, Paris, which includes some of the de Saussure and most of du Buysson's types, as well as a collection recently made by herself in the Republic of Congo. Dr Arnold Menke obliged me by sending all the specimens in the National Museum of Natural History, Washington, and Prof. J. van der Vecht with the kind permission of the director brought me all the specimens from Leiden, including one holotype. Dr M. de V. Graham arranged the loan of about 500 specimens from the University Museum, Oxford. Dr P. Oosterbroecke sent 570 specimens from the Instituut voor Taxonomische Zoölogie, Amsterdam.

The types in this genus seem to have had an unfortunate history. Before 1950 none of the authors of new species designated holotypes; unless the form happens to have been described from a single specimen one has to look for a set of syntypes and then designate a lectotype. However, in a number of species the types do not seem to be in the museum from whose collection the author described them. I am very indebted to the following gentlemen who lent type-material from the collections of which they are in charge.

Dr Max Fischer, Naturhistorisches Museum, Vienna (Kohl's types); Dr L. Besuchet, Muséum d'Histoire Naturelle, Geneva (some of de Saussure's and one of du Buysson's types); Dr E. Königsmann, Museum für Naturkunde der Humboldt-Universität, Berlin (types of Gerstaecker); Prof. W. Sauter, Entomologische Institut, Eidgenössische Technische Hochschule, Zurich (von Schulthess types); Dr Roberto Poggi, Museo Civico di Storia Naturale, Genoa (Gribodo and Guérin-Méneville types); Dr L. A. Janson, Naturhistoriska Riksmuseet, Stockholm (types of Degeer, Tullgren and P. Cameron). Unsuccessful enquiries about types were also answered by Dr P. P. d'Entrèves, Museo ed Istituto di Zoologia Sistemática dell'Università, Turin; Dr D. S. Peters, Forschungsinstitut Senckenberg, Frankfurt-am-Main; Dr Paul Dessart, Institut Royal des Sciences Naturelles de Belgique, Brussels.

The distribution I give for each species is, unless otherwise stated, based on specimens I have myself examined. In general the distribution is a list of the countries (political regions) where the species are found. The names of the countries are given according to modern usage, not necessarily what was on the label, e.g. Ghana, not Gold Coast, although Fernando Po is used for Bioko.

Depositories

| | |
|-----------------|---|
| ITZ, Amsterdam | Instituut voor Taxonomische Zoölogie, Amsterdam |
| MNHU, Berlin | Museum für Naturkunde der Humboldt-Universität, Berlin |
| IRSNB, Brussels | Institut Royal des Sciences Naturelles de Belgique, Brussels. |
| MHN, Geneva | Muséum d'Histoire Naturelle, Geneva |
| MCSN, Genoa | Museo Civico di Storia Naturale, Genoa |
| RNH, Leiden | Rijksmuseum van Natuurlijke Historie, Leiden |
| BMNH | British Museum (Natural History), London |

| | |
|------------------|---|
| UM, Oxford | University Museum, Oxford |
| MNHN, Paris | Muséum National d'Histoire Naturelle, Paris |
| NR, Stockholm | Naturhistoriska Riksmuseet, Stockholm |
| NM, Vienna | Naturhistorisches Museum, Vienna |
| USNM, Washington | National Museum of Natural History, Washington |
| EI, Zurich | Entomologische Institut, Eidgenössische Technische Hochschule, Zurich |

***BELONOGASTER* de Saussure**

Raphigaster de Saussure, 1853: 12. Type-species: *Vespa juncea* F., 1781: 468, by subsequent designation (Bingham, 1897: 381). [Homonym of *Raphigaster* Lepeletier, 1833.]

Belonogaster de Saussure, 1854: 235. [Replacement name for *Raphigaster* de Saussure.]

According to the *International Code of Zoological Nomenclature*, 1964 (Article 30(a) (i)), names ending in *gaster* are feminine. All authors except Dalla Torre (1894) have treated *Belonogaster* as masculine.

Species elongate and usually rather large, though slender. Antennae in ♂ with 12 segments, the last 4 more or less modified and spirally rolled, in ♀ with 11 segments. Clypeus in male usually white- or yellow-marked, sometimes pointed below but quite often roundly produced or even subtruncate; in ♀ usually acutely pointed below and only occasionally yellow-marked, sometimes less acutely produced and in one species rounded. Maxillary palpi with 5 segments, labial palpi with 3, the third with two long stout bristles and sometimes another shorter one. Malar space moderately long. Pronotum without an acute transverse keel, no lateral fovea, lateral lobe narrow and little produced but marked off by a distinct furrow. Anterior spiracular entrance wide but little raised, followed by a low, forwardly curved raised keel. Mesopleuron with no dorsal episternal furrow, no or only a very rudimentary scrobe or scrobal furrow. Propodeal orifice subcircular, valves in side view more or less rounded; orifice preceded by a posterior subtriangular depression from which an impressed line usually leads upwards and forwards, if complete ending in a small but often quite deep anterior depression. Hind wing with the anal lobe small. Gastral segment 1 forming a petiole which is at least relatively long and narrow, segment 2 also narrowed to an anterior stalk which is often quite long and narrow. Male aedeagus serrate beneath from ventral process to near its tip.

Larval head without bristles, clypeus very transverse, at least four times as wide as high, labrum trilobed, ventral margin with numerous, strong, black, angular papillae; both labrum and clypeus capable of compression from side to side and protrusion, as in *Mischocyttarus* de Saussure. Mandible with a long, acute dorsal tooth and a shorter, ventral preapical one. First thoracic spiracle, though not very large and only two-thirds as big as the antennal ring, yet twice as large as the other spiracles.

The nest is a single, pedunculate, exposed comb, the cells usually forming a compact more or less oval group but in the Madagascan *B. brevipetiolata* they are arranged in a long thread (du Buysson, 1909: pl. 6, fig. 1). In the usual type of comb there are often a few very large completed or nearly completed cells round whose bases are grouped many very short cells. When the large cells are vacated much of their material seems to be re-used in new cells. The colonies are social, though usually not very large. The worker caste seems to differ little from the queens and only statistically (Richards, 1969; Pardi & Piccioli, 1970). The males are much more distinct. According to du Buysson (1909: 211) the prey consists mainly of caterpillars. Other notes on the biology will be found in Roubaud (1916), Pardi (1977), Pardi & Piccioli (1978), and Piccioli (1968). The genus seems to be rather uniform and I have not found it possible to divide it into subgenera. Even species-groups are often rather indefinite and intergrade.

Key to species of *Belonogaster* (excluding Madagascar, see p. 46)**Females**

No females have been seen of *B. hirsuta* sp. n., *B. libera* sp. n., *B. nitida* sp. n., *B. punctata* sp. n., *B. rothkirchi* von Schulthess, *B. ugandae* sp. n.

- 1 Clypeus below regularly rounded and a little produced over its whole width. Gastral petiole with proximal half wider than distal half, stalk of second gastral tergite as long as broad.
Ferruginous, spot on frons; mesosoma, gastral tergites 3–4, black, second tergite with 2

- large comma-shaped yellow spots. Legs ferruginous. Wings light ferruginous, tip fuscous, length 18.0 mm. Natal *B. acaulis* sp. n. (p. 61)
- Clypeus below strongly pointed and produced. Gastral petiole with distal half as wide or wider than proximal half, stalk of second tergite at least as long as broad (except *B. turgida*) 2
- 2(1) Part of gastral petiole from the spiracles to apex not more than 1.5 times as long as broad. Stalk of second gastral tergite hardly developed, much wider than long. Gastral tergites 2–4 each with two creamy white spots. Fernando Po *B. turgida* Kohl (p. 60)
- Gastral petiole with part behind the spiracles much longer. Stalk of second gastral tergite at least as long as broad 3
- 3(2) Gena nearly twice as wide as eye in profile. 4
Stalk of second gastral tergite 1.5–2.0 times as long as broad. (When in doubt try also couplet 54.) 4
- Gena not more than 1.5 times as wide as eye in profile 6
- 4(3) Gaster posteriorly with numerous obliquely outstanding, short pale or blackish bristles. Gastral tergite 2 usually not yellow marked (only 1 out of 15 specimens with a pair of round spots). Gena a little narrower. Stalk of second gastral tergite rather longer. Tips of wings a little darkened. (*B. brunnea* Ritsema) 44
- Gaster posteriorly with only a few, mostly marginal, pale or black bristles. Gastral tergite 2 with a narrow transverse yellow band or much larger pale yellow comma-shaped spots. Gena a little wider. Stalk of second gastral tergite rather shorter. Tips of wings more darkened. (*B. clypeata* Kohl) 5
- 5(4) More ferruginous, less black. Gastral tergites 3–4 dark ferruginous. Legs usually entirely ferruginous. Wings light brown, tips somewhat darkened. Propodeal hairs pale. Bristles amongst tomentum on gaster less distinct. Uganda, Zambia, Zaire, Zimbabwe, Malawi, Tanzania, Mozambique, South Africa *B. clypeata clypeata* Kohl (p. 66)
- More black, less ferruginous. Thorax, propodeum and gastral tergites 3–4, black. Coxae and femora black. Wings, especially the tips, darkened. Propodeal hairs black. Bristles amongst the tomentum on gaster more distinct, blacker. Zaire, Angola, Uganda, Zambia *B. clypeata fuscata* subsp. n. (p. 67)
- 6(3) Gaster on posterior tergites with short black bristles protruding amongst the pale tomentum 7
- Gaster with no black bristles, though sometimes white or brownish ones protruding amongst the tomentum (occasionally a few fine black hairs in *B. brevitarsus*) 22
- 7(6) Propodeum smooth, closely and finely reticulate, without striae, punctures, tomentum or hairs 8
- Propodeum not so smooth, with at least traces of striae, punctures, tomentum and hairs 10
- 8(7) Wings blackish, mesosoma and legs black. Mesoscutum with no tomentum but with outstanding black hairs and close, very large shallow punctures. Mid and hind femora beneath with distinct pale tomentum and greyish hairs. Stalk of second gastral tergite 1.5 times as long as broad. Wing-length 14.0 mm. Cameroun *B. atrata* von Schulthess (p. 59)
- Wings red-brown; at most tip blackish. At least propodeum ferruginous. Mesoscutum with distinct tomentum and with small, deep or practically no punctures 9
- 9(8) Mesoscutum with outstanding black hairs, dense punctures and dense brassy tomentum. Thorax largely, legs and much of antenna ferruginous. Mid and hind femora with short fine tomentum and numerous black bristles. Stalk of second gastral tergite 3 times as long as broad. Wing-length 17.5 mm. Nigeria *B. aurata* sp. n. (p. 59)
- Mesoscutum with no outstanding hairs or punctures, but with appressed, brownish tomentum. Thorax, legs and antennae mostly blackish. Mid and hind femora with close pale tomentum and a few short bristles. Stalk of second gastral tergite 1.5 times as long as broad. Wing-length 14.0–16.0 mm. Liberia, Congo, Uganda *B. levior* sp. n. (p. 58)
- 10(7) Stalk of second gastral tergite 2.0–4.5 times as long as broad; when stalk is short, the wings are black or blackish. Face not yellow-marked 11
- Stalk of second gastral tergite 1.5–2.0 times as long as broad. Humeri and mesoscutum with very short appressed black bristles which are sometimes indistinct in *B. dubia*, which nearly always has a yellow-marked face 15
- 11(10) Stalk of second gastral tergite 4.5 times as long as broad. Propodeum below usually with two yellow spots, surface striate with rather dense, short outstanding hairs. Mesopleuron practically not punctured. Mid and hind femora with relatively long

- black hairs beneath. Colour largely dark ferruginous, wing-length 15.0 mm. Fernando Po, Congo, Uganda *B. kohli* Schulz (p. 53)
- Stalk of second gastral tergite not more than 3 times as long as broad. Propodeum with less dense hairs. Often differing in other characters 12
- 12(11) Rather small species, wing-length 16.5 mm. Last segment of fore tarsus short. Hind femur beneath with many black and white bristles.
Stalk of second gastral tergite 3 times as long as broad (cf. couplet 55). Kenya, Uganda *B. brevitarsus* sp. n. (p. 92)
- Larger species. Last segment of fore tarsus long. Hind femur with no conspicuous bristles beneath 13
- 13(12) Black insect with purplish black wings. West Africa, Zaire, Uganda, Kenya, Zambia, Sudan, Malawi, Tanzania, Mozambique, South Africa (strays in Algeria (Tripoli), Arabia and India) *B. juncea juncea* (F.) (p. 48)
- Wings reddish brown with tips darker 14
- 14(13) Punctures of mesothorax often hard to see, surface with outstanding hairs and very close, silvery tomentum. Hind femora and tibiae with numerous black bristles beneath. Frons almost without black. Mesopleuron strongly punctured. Kenya, Zambia, Tanzania, Malawi, South Africa (Natal, Orange Free State), Niger *B. somereni* sp. n. (p. 50)
- Punctures of mesothorax more distinct, surface without outstanding hairs, tomentum less dense and silvery. Hind femora and tibiae with fewer black bristles beneath. Frons with more black. Mesopleuron less strongly punctured. Kenya, Zimbabwe, Uganda, Zambia, Zaire, Angola, Tanzania, Mozambique, South Africa *B. juncea colonialis* Kohl (p. 48)
- 15(10) Face nearly always with wide yellow side stripes. Large species.
Antennae almost always black, at least above. Wings brown with darker tips, rarely entirely blackish, length ca 25.0 mm. Hind femora with sparse white tomentum and short fine white bristles beneath (cf. couplet 42). West Africa, Zaire and Kenya to Tanzania, Malawi, Mozambique, South Africa *B. dubia* Kohl (p. 53)
- Face without yellow side stripes. Usually smaller and some of the other characters often different 16
- 16(15) Large species, wings purplish black, length 23.0–27.0 mm.
All femora with a line of dense white pile beneath. Mesoscutum with very short forward-pointing bristles. Stalk of second gastral tergite about twice as long as broad. Congo, Zaire, Angola, Zambia, Kenya, Zimbabwe, Malawi, Tanzania, Mozambique *B. vasseae* du Buysson (p. 56)
- Moderate sized species, wings brown or red-brown, tips usually darker, length 19.0–21.0 mm 17
- 17(16) Hind femora almost quite bare beneath. Mesoscutum with scattered moderate-sized punctures and very inconspicuous brown tomentum.
Ferruginous, including antennae, gastral tergites 3–4 black, 2–4 with yellow lateral spots. India *B. indica* (de Saussure) (p. 58)
- Hind femora at least with distinct tomentum beneath. Mesoscutum with some fine hairs or some very short bristles 18
- 18(17) Hind femora with distinct tomentum but no bristles beneath. Stalk of second gastral tergite about twice as long as broad.
Mesoscutum with rather strong and numerous punctures. Antennae ferruginous. Bristles of gaster sometimes weak (cf. couplet 45), second tergite without yellow spots. Ethiopia *B. meneliki* Gribodo (p. 52)
- Hind femora with some distinct black or paler bristles beneath. Stalk of second gastral tergite 1.5–2.0 times as long as broad 19
- 19(18) Gastral tergite 2 with large triangular yellow spots.
Mesoscutum with distinct punctures. 20
- Gastral tergite 2 without yellow spots.
Antennae black or darkened above, segments 4–5 or at least 4 distinctly longer than broad 21
- 20(19) Antennae ferruginous, segments 4–5 quadrate. No yellow spots on sternite 2 or tergites 3–4. Zimbabwe, Malawi, Tanzania, Lesotho, South Africa. (cf. couplet 32) *B. petiolata* (Degeer) (p. 71)
- Antennae black above, segments 4–5 longer than broad. Often with yellow spots on sternite 2 and sometimes on tergites 4–5.

Mesoscutum with short but dense brownish tomentum. Uganda, Kenya

- B. maculata* sp. n. (p. 71)
- 21(19) Hind femora beneath with tomentum and fine black bristles. Mesoscutum indistinctly punctured, usually with short oblique black bristles. Gastral petiole moderately stout but little widened behind, dull, densely tomentose. Congo, Zaire, Angola, Zambia, Uganda, Kenya, Sudan, Malawi *B. pennata* sp. n. (p. 51)
- Hind femora beneath with fine pale tomentum. Mesoscutum with many rather small punctures and some short hairs. Gastral petiole short, stout, very shining, scarcely tomentose. Grande Comore *B. ferruginea* sp. n. (p. 52)
- 22(6) Gena 0·4–0·6 times as wide as eye in profile. Fore tarsus with segment 5 short or else legs and gaster entirely black.
- Stalk of second gastral tergite 2·5–3·5 times as long as broad 23
- Gena 0·7–1·5 times as wide as eye in profile; or if the gena is hardly so wide, fifth segment of fore tarsus long or legs and gaster not entirely black 24
- 23(22) Last segment of fore tarsus somewhat shortened. Legs ferruginous, fore tarsi and mid and hind legs except coxae, black or nearly. Wings red-brown, tip not dark, length 13·0–18·0 mm. Gaster black, segments 1–2 ferruginous with no segment (22 specimens), segment 2 (16 specimens), segments 2–3 (3 specimens) or segments 2–4 (1 specimen) with two yellow spots. Africa south of the Sahara *B. filiventris* (de Saussure) (p. 75)
- Last segment of fore tarsus elongate. Legs black. Wings grey, costal region brown, tips not dark, length 17·0 mm. Gaster black. Congo *B. nigricans* sp. n. (p. 77)
- 24(22) Gena about 0·5 times as wide as eye in profile 25
- Gena more than 0·7 times as wide as eye in profile 26
- 25(23) Stalk of second gastral tergite 3·5–4·0 times as long as broad. Wings yellow-brown, tips a little darkened, length 14·0–17·5 mm. Gastral tergite 2 with two yellow spots but no other yellow markings (*cf.* couplet 37) *B. macilenta* (F.) (p. 81)
- Stalk of second gastral tergite twice as long as broad. Wings tinged with red-brown, length 18·0 mm. Gastral tergite 2 with no yellow spots but mandibles, clypeus, tibiae and stalk of second gastral tergite, yellow.
- Thorax not punctured, more or less granulate. Gaster ferruginous, tergites 3–6 a little darker. Congo *B. kelnepillautae* sp. n. (p. 77)
- 26(24) Mesoscutum and gastral tergites 3–5 with dense brassy tomentum.
- Gena as wide as eye in profile. Antennae and legs black. Mesoscutum with a few outstanding hairs. Stalk of second gastral tergite 2·5 times as broad. Uganda, Burundi, Zaire *B. leonhardtii* du Buysson (p. 87)
- Mesoscutum and gastral tergites 3–5 without dense brassy tomentum 27
- 27(26) Frons and whole mesosoma with very close and rather strong punctures.
- Femora with very short white pile beneath. Mesoscutum with sparse brownish tomentum. No yellow markings. Uganda *B. multipunctata* sp. n. (p. 55)
- Frons and mesosoma not so uniformly and very rarely so strongly punctured 28
- 28(27) Clypeus and gena entirely yellow. Stalk of second gastral tergite 4–5 times as long as broad.
- Antennal segments 4–5 distinctly longer than broad 29
- Clypeus and gena not entirely yellow or, if the clypeus is entirely yellow, the stalk of the second gastral tergite is not longer than broad 30
- 29(28) Front tarsal segments rather short. Stalk of second gastral tergite a little longer. Hind femora with moderately long and numerous black bristles. Much of thorax, legs and four pairs of spots on gaster, yellow. Uganda, Cameroun *B. flava* sp. n. (p. 75)
- Front tarsal segments long. Stalk of second gastral segment a little shorter. Hind femora with numerous moderately long, pale hairs beneath. Thorax, legs and gaster pale yellowish brown. Sierra Leone, Congo *B. turbulenta* Kohl (p. 74)
- 30(28) Clypeus, mandibles, inner orbits, yellow. Stalk of second gastral tergite 1·0–1·5 times as long as broad.
- Traces of suffused yellow spots on gastral tergite 2, light ferruginous with very inconspicuous brown tomentum, wing-length 14·0–16·0 mm (*cf.* couplet 32)
- B. lateritia* Gerstaecker (p. 72)
- Clypeus not entirely yellow, though sometimes more or less yellow suffused or striped. Stalk of second gastral tergite at least 1·5 times as long as broad and often much longer 31
- 31(30) Clypeus more or less evenly suffused with yellow. Antennal segments 4–5 not or scarcely longer than broad; at least 5 quadrate.

Antennae and legs ferruginous except sometimes the femora. Gastral tergite 2 with large triangular yellow spots

32

- Clypeus with ventral quarter yellow, or with yellow side stripes, or entirely ferruginous. Antennal segments 4-5 or at least 4 clearly longer than broad

33

32(31) Antennal segments 4-5 quadrate, 4 occasionally a little longer. Clypeus with more punctures bearing black bristles on the upper half. Mesosoma usually black with more punctures, humeri and mesoscutum usually with more short black bristles. South Africa, Lesotho, Malawi, Zimbabwe, Tanzania *B. petiolata* (Degeer) (p. 71)

- Antennal segments 4 usually a little longer, rarely quadrate. Clypeus usually with fewer black-bristle-bearing punctures dorsally. Mesosoma usually ferruginous, rarely a little blackened, punctures often less numerous, humeri and mesoscutum usually with fewer bristles which are often pale. Angola, South Africa, Mozambique, Tanzania, Kenya, Malawi, Zimbabwe, Zambia *B. lateritia* Gerstaecker (p. 72)

33(31) Clypeus with somewhat variable yellow or creamy markings.
(Some specimens of *B. dubia*, couplet 15, in which the short black bristles on the gastral tergites 3-5 are indistinct, may run down here)

34

- Clypeus without yellow markings. (But see *B. abyssinica* du Buysson, couplet 58)

38

34(33) Clypeus with ventral quarter yellow.
Antennae much blackened, four hind legs mainly blackish. Gena 0.8 times as wide as eye in profile. Gastral tergite 2 with two large yellow spots. Stalk of second gastral tergite 2.5 times as long as broad. Mid and hind femora with short white and a few black bristles beneath. Segment 5 of fore tarsus short. Zambia, Tanzania *B. bimaculata* sp. n. (p. 78)

35

- Clypeus with creamy yellow side stripes; sometimes only narrowly separated on disk

35

35(34) Stalk of second gastral tergite about 1.5 times as long as broad. Gena 1.4 times as wide as eye in profile. Fifth segment of fore tarsi short.

Gastral tergite 2 with two small yellow spots. Tanzania (including Zanzibar)

B. tarsata Kohl (p. 73)

- Stalk of second gastral tergite twice or more as long as broad. Gena never more than a little broader than eye in profile. Fifth segment of fore tarsi long, except in *B. facialis*

36

36(35) Gaster with two yellow spots on each of tergites 2-4. Mesoscutum with dense silvery tomentum. Fore tarsi with segment 5 short.

Mid and hind femur with numerous white bristles beneath. Gena just broader than eye in profile. Stalk of second gastral tergite 2.5 times as long as broad. Pronotum, scutellum, metanotum and coxae not yellow-marked. Kenya, Uganda, Tanzania, Zambia, Malawi, Mozambique *B. facialis* du Buysson (p. 80)

37

- Gaster with a pair of yellow spots on tergite 2 or none. Mesoscutum with somewhat yellow dense silvery tomentum. Fore tarsus with fifth segment elongate

37

37(38) Face with sides and ventral margin creamy yellow, but no other parts yellow; no spots on gastral tergite 2. Hind femur with numerous white, moderately long bristles beneath. Gena as wide as eye in profile. Stalk of second gastral tergite more than 2.5 times as long as broad. Mid and hind legs black but fifth tarsal segment reddish. Wings a little brown, tips not darker. Kenya, Uganda, Congo *B. pusilloides* sp. n. (p. 80)

37

- Sides of clypeus, sometimes spot on pronotum, stripes on coxae, stalk and spots on second gastral tergite yellow. Mid and hind femur with short black bristles at base beneath. Gena half as wide as eye in profile. Stalk of second gastral tergite twice as long as broad. Femora and segment 5 of tarsi ferruginous, rest of tarsi black. Wings yellowish brown, tips a little darkened. Sierra Leone, Ghana, Nigeria, Guinea-Bissau *B. macilenta* (F.) (p. 81)

38

38(33) Mesoscutum and humeri with outstanding hairs, long except in *B. brunnea*, *B. brunnescens*, *B. pileata* and sometimes *B. saeva*

39

- Mesoscutum and humeri without or almost without outstanding hairs, long or short

47

39(38) Large species (wing-length 24.0 mm), black except for much of the head and gastral petiole and stalk of tergite 2. Hind femora without bristles or pile beneath.

Wings dark, usually black without slight purple reflections. Mesoscutum and humeri with close small punctures bearing outstanding black bristles. Propodeum dorsally obliquely striate and punctured but without hairs. Kenya, Tanzania, Malawi

B. pileata sp. n. (p. 62)

- Similar large, dark species have stronger thoracic punctures or bristles or pile beneath the hind femur

40

40(39) Mesoscutum and humeri with dense, quite strong punctures and dense but inconspicuous

brownish tomentum. All femora with a line of dense very short white pile beneath, sometimes more feeble on hind pair.

- Propodeum more or less rugose. Large, wing-length 24.0 mm, black species with uniformly more or less dark wings. Clypeus, legs except tibiae and tarsi, base of gaster reddish. Sierra Leone, Ghana, Zaire, Kenya, Uganda, Zimbabwe, Malawi, Congo, Ivory Coast, Gabon, Chad *B. saeva* de Saussure (p. 61)
- Mesoscutum and humeri without dense, strong punctures. Hind femur with short black bristles beneath near base (except in the pale winged, uniformly red-brown *B. brunescens*) 41
- 41(40) Wings brownish hyaline. Whole body uniformly reddish brown. Femur with white tomentum and a few white bristles beneath.
- Wing-length 17.0–24.0 mm. Clypeus finely reticulate with rather large punctures on ventral half. Ethiopia and Africa south of the Sahara *B. brunescens* sp. n. (p. 70)
- Wings darker brown with darker tips. Body partly black, often with some yellow markings. Hind femur with short black bristles at base beneath 42
- 42(41) Usually larger (wing-length 22.0 mm or more), usually with yellow side lines on face. Usually with black bristles protruding between the tomentum on the gaster posteriorly. Dorsal half of clypeus with fine reticulation and relatively close punctures (*cf.* couplet 15). West, East and South Africa *B. dubia* Kohl (p. 53)
- Usually smaller, rarely with yellow side lines on face. Gaster with black bristles posteriorly only in some specimens of *B. meneliki*. Dorsal half of clypeus with rather strong granulation and sparse punctures. Or else a uniformly brown species or one with black hairs on propodeum 43
- 43(42) Bristles of mesoscutum and humeri short, more or less stout. Clypeus with dorsal three-quarters with unusually coarse reticulation. Gena wide, at least 1.5 times as wide as eye in profile. Mesoscutum with quite dense brownish tomentum.
- Wing-length 14.5–18.0 mm (*cf.* couplet 4) (*B. brunnea* Ritsema) 44
- Bristles of mesoscutum and humeri longer and finer, hair-like. Clypeus rarely with such coarse reticulation. Gena narrower. Mesoscutum with sparser, whitish or dense greyish tomentum 45
- 44(43) Wings uniformly pale greyish brown. Femora reddish. Senegal, Liberia, Ghana, Sierra Leone, Nigeria, Fernando Po, Gabon, Congo, Rwanda *B. brunnea brunnea* Ritsema (p. 64)
- Wings dark red-brown, tips darker. Femora usually black. Uganda, Kenya *B. brunnea nigriclava* subsp. n. (p. 66)
- 45(43) Larger, wing-length 19.0 mm. Hind femora with a few pale or more rarely short black bristles beneath.
- Black, head except frons, usually front of pronotum, scutellum and metanotum, gastral tergites 1–2, sometimes 5–6 (more or less), red; tergite 2 sometimes with two yellow spots. Wings yellow-brown, tips dark. Stalk of second gastral tergite twice as long as broad. Propodeum with dense black hairs and usually strong, oblique striae but sometimes striae weaker and large, shallow punctures more obvious. Gaster sometimes with a few protruding black bristles. Ethiopia *B. meneliki* Gribodo (p. 52)
- Smaller, wing-length 16.0–17.5 mm. Hind femora with numerous short black bristles beneath 46
- 46(45) Wings brownish hyaline, length 17.5 mm. Stalk of second gastral tergite 3.5 times as long as broad. Mesosoma and gaster ferruginous, segment 4 a little darkened, 5–6 usually reddish, tergite 2 with a pair of transverse yellow spots. Mesoscutum without tomentum. Principé I. *B. principalis* sp. n. (p. 82)
- Wings brown, tips darker, length 16.0 mm. Stalk of second gastral tergite 2.5 times as long as broad. Black, head except frons in part, tibiae and tarsi, gastral segments 1–2, 5–6, reddish, tergite 2 with two small round yellow spots. Mesoscutum with not very dense, dull greyish tomentum. Angola *B. jordani* sp. n. (p. 83)
- 47(38) Mesoscutum with dense silvery tomentum 48
- Mesoscutum with less dense, fine tomentum which is usually quite inconspicuous 51
- 48(47) Mesoscutum and scutellum with deep, rather large punctures. Propodeum with strong striae.
- Mesoscutum with very dense silvery tomentum. Whole frons, upper part of gena, antennae, mesosoma, legs, gaster behind the stalk of tergite 2, black. Wings blackish with slight purple reflection, length 16.5 mm. Hind femora with dense but rather short hairs beneath. Uganda *B. punctilla* sp. n. (p. 83)

- Mesoscutum and scutellum with much smaller less deep punctures. Propodeum less strongly striate 49
- 49(48) Wings blackish or dark grey, length 17.0-22.5 mm. Stalk of second gastral tergite 2.5 times as long as broad.
 Dark ferruginous, mesoscutum and gastral segments 3-5 blackish, 2 with large whitish yellow triangular spots. Hind femur with a few pale bristles beneath. Sudan (Kordofan, Dhafur), Congo (northern) *B. fuscipennis* du Buysson (p. 86)
- Wings red- or yellow-brown, tips darker, length 16.0-22.5 mm. Stalk of second gastral tergite 2.5-3.5 times as long as broad 50
- 50(49) Gaster often with 3 pairs of yellow spots in West African specimens but sometimes with 1 pair only on tergite 2, or, in South African specimens often with none. Legs often reddish with dark tarsi. Wings usually rather pale with tips darkened, length 16.0-22.5 mm. Antennal segment 3 nearly = 4 + 5 + half 6. Stalk of second gastral tergite 2.5-3.5 times as long as broad. Mid and hind femora with practically no bristles beneath. Chad, West, Central and South Africa *B. grisea* (F.) (p. 87)
- Gaster usually with no yellow spots, rarely a pair on tergite 2. Legs black or ferruginous with mid and hind tibiae and tarsi black. Wings red-brown, tips infuscate, length 18.0-20.0 mm. Antennal segment 3 nearly = 4 + 5 + 6. Stalk of second gastral tergite 2.5 times as long as broad. Hind femur with a few short bristles beneath.
 Head and mesosoma ferruginous, mesoscutum black with tomentum hiding the cuticle, gaster with very dense silvery tomentum posteriorly, cuticle ferruginous with tergites 3-6 more or less blackened. Kenya, Tanzania *B. neavei* sp. n. (p. 89)
- 51(47) Hind femora with numerous short black bristles beneath. Stalk of second gastral tergite 1.5-2.5 times as long as broad. Fifth segment of fore tarsus long.
 Mesoscutum blackish with at most indistinct punctures. Wings with dark tips, length not more than 19.5 mm. Gaster with no yellow markings 52
- Hind femora without black bristles beneath or (*B. brevitarsus*) stalk of second gastral tergite 2.5-3.5 times as long as broad and fifth segment of fore tarsus short 53
- 52(51) Stalk of second gastral tergite 2.0-2.5 (rarely 3.5) times as long as broad. Gena 1.5 times as wide as eye in profile. Mesosoma granulate, not punctured. Legs dark ferruginous, tarsi black. Wings dark grey, length 16.5-19.0 mm. Sierra Leone, Gabon, Congo
B. leonina sp. n. (p. 90)
- Stalk of second gastral tergite 1.5 times as long as broad. Gena 1.5 times as wide as eye in profile. Mesosoma with a few punctures on the mesoscutum and many fine ones on the mesopleuron. Legs ferruginous, tibiae and tarsi black. Wings dark reddish brown, length 19.5 mm. Congo *B. barbata* sp. n. (p. 92)
- 53(51) Stalk of second gastral tergite not more than 2, usually 1.5 times as long as broad.
 Hind femur with a few short white bristles beneath. Gaster tergite 2 usually with yellow spots. Mesoscutum with close brownish tomentum 54
- Stalk of second gastral tergite twice as long as broad or longer 55
- 54(53) Stalk of second gastral tergite usually yellowish, twice as long as broad. Hind femora ferruginous. Gaster with two large comma-shaped yellow spots on tergite 2. Thorax and gastral tergites 3-4 usually more or less blackened. Wings rather pale. Zambia, Zimbabwe, Malawi, Tanzania, Mozambique, South Africa *B. brachystoma* Kohl (p. 68)
- Stalk of second gastral tergite usually ferruginous, rarely more than 1.5 times as long as broad. Hind femora usually blackened at base. Gaster with or without comma-shaped yellow spots on second tergite. Thorax and gastral tergites 3-4 more often blackened. Wings usually rather dark.
 Clypeus strongly reticulate above. Apex of gastral petiole usually with two pale dots. Kenya, Zambia, Zimbabwe, Malawi, Tanzania, Botswana, South Africa
B. freyi du Buysson (p. 69)
- 55(53) Stalk of second gastral tergite 3.0-3.5 times as long as broad. Fifth segment of fore tarsus short.
 Mid and hind legs blackish, hind femora beneath with some black bristles. Gaster normally without yellow spots, often with some black hairs protruding through the tomentum (*cf.* couplet 12). Kenya, Uganda *B. brevitarsus* sp. n. (p. 92)
- Stalk of second gastral tergite not longer than 2.5 times as long as broad, or, in *B. longitarsus* sometimes as long as 3.5 times but then the fifth segment of the fore tarsus is long 56
- 56(55) Mesoscutum dull coal-black with very distinct punctures, especially in front. Mesopleuron closely and coarsely punctured.

- Scutellum and metanotum red, contrasting with the mesoscutum and propodeum. Stalk of second gastral tergite 2 as long as broad. Legs ferruginous, each femur with a line of white pile beneath. Gaster black, segments 1-2 red, tergite 2 with two elongate, transverse yellow spots, second sternite with two smaller yellow spots. Wings dark purplish brown, length 16.0-18.0 mm. Socotra *B. saussurei* Kirby (p. 93)
- Thorax ferruginous or, if black, much less strongly punctured 57
- 57(56) Thorax black, scutellum and metanotum sometimes red.
Stalk of second gastral tergite 2.5 times as long as broad 58
- Thorax ferruginous 59
- 58(57) Legs and thorax entirely black. Wings purplish black, length 20.0 mm. Femora with a line of white pile beneath. Ethiopia *B. abyssinica* du Buysson (p. 96)
- Legs ferruginous, scutellum and metanotum red. Wings yellow-brown, tips very dark fuscous, length 17.0-20.0 mm. Femora beneath only with white tomentum.
Second gastral tergite sometimes with large triangular yellow spots but the yellow sometimes more or less completely invaded by ferruginous. Somalia
B. adenensis somaliensis subsp. n. (p. 100)
- 59(57) Wings dark purplish brown, length 19.0-21.0 mm. Femora with lines of not very dense white pile beneath.
Thorax with numerous rather fine punctures. Propodeum striate behind. Gastral tergite 2 with transverse yellow spots, sternite 2 with spots or a band; gastral tergites 3-4 largely blackish. Oman (Dhofar) *B. guichardi* sp. n. (p. 94)
- Wings much paler, at least on proximal three-quarters. Femora without lines of white pile beneath 60
- 60(59) Gena 0.6-0.7 times as wide as eye in profile. Prementum and base of stipes beneath bare.
Stalk of second gastral tergite 2.5-3.5 times as long as broad.
Ferruginous, gastral tergite 2 with or without two round yellow spots. Uganda, Zambia, Angola, Mozambique, Tanzania, South Africa *B. longitarsus* sp. n. (p. 97)
- Gena 0.8-1.0 times as broad as eye in profile. Prementum and base of stipes with several long black bristles beneath. Stalk of second gastral tergite 2.0-2.5 times as long as broad.
Second gastral tergite, if with yellow spots, with narrow transverse ones 61
- 61(60) Gastral tergites 3-4 black. Stalk of second gastral tergite 2.5 times as long as broad.
Wings reddish brown with fuscous tips, length 17.0-20.0 mm. Gaster with no yellow spots. Southern Yemen (including Aden) *B. adenensis adenensis* Giordani Soika (p. 99)
- Gastral tergites 3-4 ferruginous. Stalk of second gastral rather shorter.
Tips of wings less darkened; wing-length 18.0-21.5 mm. (Two species often not certainly distinguishable in ♀ except by the locality.) 62
- 62(61) Gastral tergite 2 with two narrow, very transverse spots at apex; sternite 2 also with two yellow spots or a band. Mesoscutum more strongly punctured. Southern Yemen, Yemen, SE. Saudi Arabia *B. arabica* Giordani Soika (p. 96)
- Gastral tergite 2 sometimes without yellow spots. Mesoscutum usually less strongly punctured. W. Saudi Arabia (around Jiddah) *B. filiformis* (de Saussure) (p. 100)
- In *B. adenensis*, *B. arabica* and *B. filiformis*, the clypeus and malar space are sometimes yellowish. A female of *B. arabica* from Southern Yemen: W. Aden, Jebel Jihaf, 7,100 ft [2330 m], has the whole face yellow.

Males

No males have been seen of *B. acaulis* sp. n., *B. atratus* von Schulthess, *B. aurata* sp. n., *B. barbata* sp. n., *B. ferruginea* sp. n., *B. flava* sp. n., *B. fuscipennis* du Buysson, *B. indica* (de Saussure), *B. jordani* sp. n., *B. kelnepillautae* sp. n., *B. kohli* Schulz, *B. multipunctata* sp. n., *B. nigricans* sp. n., *B. punctilla* sp. n., *B. turbulenta* Kohl, *B. turgida* Kohl.

- 1 Whole body including propodeum, smooth and shining. Small species, wing-length 12.0 mm.
Clypeus very obtusely angled below. Antennal segments 4 and 5 four to five times as long as broad, segments 10-11 with a prominence at each end beneath, segment 12 about five times as long as broad. Nigeria (eastern province) *B. nitida* sp. n. (p. 60)
- Body dull with reticulation and tomentum. Species larger 2
- 2(1) Propodeum smooth and rounded, very finely granulate without striae, punctures, hairs or tomentum.

Mesosoma without punctures and little tomentum. Stalk of second gastral tergite 1·5 times as long as broad. Gastral tergite 2 without yellow marks, posterior segments with short black bristles protruding. Wing-length 14·0 mm. Uganda, Liberia, Congo

- B. levior* sp. n. (p. 58)
- Propodeum not smooth, without sculpture or vestiture 3
- 3(2) Clypeus below centrally only slightly protruding though obtusely angled, hardly protruding beyond the lateral lobes. Antennal segment 12 more or less blackened, flattened and shining 4
- Clypeus below either little projecting but round or strongly pointed and projecting beyond the lateral lobes. Antennal segment 12 rarely blackened, flattened and shining 7
- 4(3) Clypeus below centrally with a slightly protruding blunt point but little bent down. Antennal segment 12 less flattened, narrower, usually blackened. Gena not quite as wide as eye. Hind trochanter and femur beneath with dense short white, and some longer blackish hairs. Very little yellow on clypeus, no yellow spots on gaster (*B. brunnea* Ritsema) 22
- Clypeus with central process rounded. Antennal segment 12 strongly flattened, very broad, nearly always blackened beneath. Gena as wide or distinctly wider than eye. Hind trochanter and femur with longer and denser black or white hairs. Clypeus with yellow side-stripes, tergite 2 with yellow spots 5
- 5(4) Clypeus with very short, distinctly bent down central process. Gena much wider than eye. Hind femur and tibia with long hairs beneath. Gastral tergite 2 with narrow transverse yellow apical spots (*B. clypeata* Kohl) 6
- Clypeus with somewhat longer, not bent down, rounded central process. Gena about as wide as eye or a little wider. Hairs of hind femur and especially of hind tibia fewer and shorter. Gastral tergite 2 with two large comma-shaped yellow spots. Zimbabwe, Zambia, Malawi, Tanzania, Mozambique, South Africa *B. brachystoma* Kohl (p. 68)
- 6(5) Colour paler ferruginous; knees, especially the mid pair, yellowish. Sides of clypeus with little yellow. Hairs of femora and tibiae mostly white. Congo, Zambia, Uganda, Zimbabwe, Malawi, South Africa *B. clypeata clypeata* Kohl (p. 67)
- Colour darker, head beneath and frons black; knees not yellow. Sides of clypeus pale yellow. Long hairs of hind legs black. Zaire, Angola, Uganda, Zambia
- B. clypeata fuscata* subsp. n. (p. 67)
- 7(3) Large (wing-length 22·0–25·0 mm), mainly black species, wings dark or black. Clypeus angled below but tip more or less rounded. Antennal segment 12 somewhat flattened, widened to apex, hardly curved 8
- Smaller and not black or, if approaching this size and black, either the clypeus is widely rounded or pointed below, or antennal segment 12 is cylindrical and curved 11
- 8(7) Femora without pile or hairs beneath.
- Gaster without bristles among the tomentum 9
- Femora beneath with pile, tomentum or hairs beneath.
- Mesoscutum more or less strongly punctured 10
- 9(8) Mesoscutum punctured, without hairs. Propodeum striate. Flagellar segments longer, segment 8 2·1 times as long as broad. Kenya, Tanzania, Uganda, Zaire, Sierra Leone (?), Congo, Ivory Coast, Gabon, Chad *B. saeva* (de Saussure) (p. 61)
- Mesoscutum hardly punctured with very short hairs. Propodeum not striate. Flagellar segments shorter, segment 8 not quite twice as long as broad. Kenya, Malawi, Tanzania
- B. pileata* sp. n. (p. 62)
- 10(8) All femora with a line of dense white tomentum beneath, hind femur beneath without hairs. Mesoscutum strongly punctate, without hairs. Propodeum striate. Gaster with black bristles amongst the tomentum. Congo, Zaire, Zambia, Uganda, Kenya, Zimbabwe, Angola, Malawi, Mozambique *B. vasseae* du Buysson (p. 56)
- Fore and mid femora with a line of dense white pile beneath, hind femora with rather less close white pile and many long black hairs. Mesoscutum very strongly and densely punctured and with long black hairs. Propodeum clathrate above, striate below. Gaster with very fine black bristles amongst the tomentum. Congo, Tanzania *B. hirsuta* sp. n. (p. 55)
- 11(7) Clypeus widely rounded below, not or scarcely pointed, not much projecting beyond the lateral lobes 12
- Clypeus below always with a pointed tip and usually produced well beyond the lateral lobes 24
- 12(11) Fore and mid tarsi shortened and widened, segment 4 of mid tarsus much broader than long. Gastral tergite 2 with two yellow spots, stalk at least 3 times as long as broad. Gastral

- petiole very long and slender. Thorax hairy. Antennal segment 11 with a strong protuberance beneath 13
- Fore and mid tarsi longer and narrower (as usual or almost so), segment 4 of mid tarsus clearly longer than broad 14
- 13(12) Antennae with segments 1–8 darkened above. Mid tarsus moderately widened, segment 5 at least twice as long as wide. Legs not marked with yellow, mid and hind legs largely dark. Hind femur with dense white pile and scattered longer black bristles beneath.
Fore tarsus very wide. Mid tibia without long hairs beneath. Kenya, Uganda
B. brevitarsus sp. n. (p. 92)
- Antennae with segments not darkened above. Mid tarsus with segment 5 clearly less than twice as long as broad. Mid and hind legs largely ferruginous, fore and mid tarsi and mid femur anteriorly, mid tibia beneath, yellow. Hind femur beneath, especially towards the base, with long white or sometimes black hairs.
Hind tibia with sparse long hairs beneath. Africa south of the Sahara
B. filiventris (de Saussure) (p. 75)
- 14 Antennal segment 12 flattened and curved, usually blackened. Clypeus with ventral margin bisinuate. Stalk of second gastral tergite 1.5 times as long as broad.
Antennal segments 1–7 more or less blackened above, segment 3 longer than 4 + 5. Clypeus with a slightly produced central point below. Hind femur with black and white bristles beneath. Gaster with no yellow spots. West Africa (cf. couplet 23)
B. brunnea Ritsema (p. 64)
- Antennal segment 12 less flattened and curved. Clypeus smoothly curved from side to side.
Stalk of second gastral tergite longer 15
- 15(14) Stalk of second gastral tergite 4.0–4.5 times as long as broad 16
- Stalk of second gastral tergite 1.5–2.5 times as long as broad 18
- 16(14) Gaster with no black hairs amongst the tomentum. Propodeum with strong striae and long outstanding silvery hairs. Cameroun 17
- Gaster with fine black hairs amongst the silvery tomentum. Propodeum dull, granulate with mostly recumbent silvery grey hairs.
Antennae dark above, 8–11 pale, 9–11 with flat projections beneath, 12 somewhat flattened, distal three-quarters shining black, tip narrowly rounded. Gastral petiole long and narrow. Wings brown, segments 2–3 with large yellow spots. Liberia
B. libera sp. n. (p. 86)
- 17(16) Mesoscutum, humeri and most of mesopleuron blackish with strong quite close punctures. Antennae black above, segment 12 slightly flattened, straight below, curved above, segments 10–11 long cylindrical, without prominences beneath. Gastral petiole very long and narrow. Wings light grey, length 19.5 mm. Gastral tergite 2 with no yellow spots. Cameroun *B. punctata* sp. n. (p. 84)
- Thorax ferruginous with weak, indistinct punctures. Antennae ferruginous, segment 12 shorter, more curved below, segments 10–11 short with a strong projecting keel below. Gastral petiole rather short, apical part distinctly widened. Wings hyaline, veins ferruginous, length 17.0 mm. Gastral tergite 2 with two suboval almost contiguous spots. Cameroun *B. rothkirchi* von Schulthess (p. 85)
- 18(15) Large species, wing-length 19.0–28.0 mm. Gaster with short black bristles protruding amongst the tomentum.
Clypeus with wide yellow side-stripes. Tips of wings hardly darkened. Frons ferruginous 19
- Smaller species, wing-length 13.0–19.0 mm. Gaster without black bristles amongst the tomentum 20
- 19(18) Larger species, wing-length 22.0–28.0 mm. Antenna blackened above except segments 10–12, 12 sometimes more or less blackened but not strongly contrasting with adjoining segments, somewhat flattened, straight beneath, curved above, widening to apex. Tarsi black.
Clypeus below bisinuate, central lobe regularly curved, a little projecting. West Africa, Zaire and Kenya to Tanzania, Malawi, Mozambique, South Africa. . . . *B. dubia* Kohl (p. 53)
- Wing-length 22.0 mm. Antennae black above, segments 1–2 and extreme base of 3 yellow beneath, 3–9 ferruginous beneath, 10–11 light ferruginous, 12 blackish, not shining, a little flattened and curved, tip rounded, 10–11 cylindrical, not swollen beneath. Tarsi black, last segment of front pair reddish. Uganda *B. ugandae* sp. n. (p. 54)
- 20(18) Antennal segment 12 ferruginous, hardly shining with a few hairs, flat, straight below, curved above, tip rounded-truncate.

- Antennal segment 11 cylindrical, 10 with a slight hump below. Mesoscutum with short, humeri with longer hairs. Face except for a rather narrow brown central stripe, light yellow, central lobe below regularly rounded. Hind femur beneath with tomentum and a few short bristles. Kenya, Uganda *B. pusilloides* sp. n. (p. 80)
- Antennal segment 12 shining, nearly always black, at least above, usually less flattened, more curved, tip rounded 21
- 21(20) Mesoscutum and humeri without outstanding hairs. Antennal segments 10–11 pale ferruginous without prominences beneath.
Clypeus with wide lateral white side-stripes, central lobe below just rounded, distinctly projecting. Hind femur beneath with long black and sometimes also some white hairs. Sierra Leone, Gabon, Congo *B. leonina* sp. n. (p. 90)
- Mesoscutum and humeri with distinct outstanding hairs or else antennal segments 10–11 with distinct prominences beneath 22
- 22(21) Frons brown. Antennal segment 12 shining black above, ferruginous below, much flattened and curved, 10–11 with considerable protuberances beneath. Clypeus almost regularly curved below, lateral white stripes quite wide. Hind femur beneath with white tomentum and a few short hairs. Guinea-Bissau, Sierra Leone, Ivory Coast, Ghana, Nigeria
B. macilenta (F.) (p. 81)
- Frons black. Antennal segment 12 usually entirely shining black, rather less flattened, segment 11 cylindrical, 10 considerably thicker with a raised line beneath.
All tarsi with fifth segment pale. All femora with long, rather dense hairs beneath (*cf.* couplet 14), (*B. brunnea* Ritsema) 23
- 23(22) Posterior part of gaster with less dense silvery tomentum. Wings distinctly reddish brown. Antennal segment 12 a little narrower. Kenya, Uganda
B. brunnea nigriclava subsp. n. (p. 66)
- Posterior part of gaster with very dense silvery tomentum. Wings greyer. Antennal segment 12 a little thicker. Sierra Leone, Liberia, Ghana, Fernando Po, Congo
B. brunnea brunnea Ritsema (p. 64)
- 24(11) Thorax and gaster with dense, brassy tomentum, hiding the cuticle.
Antennae black, segment 12 much flattened, long oval, straighter below, more curved above, shorter than 11, dull; segments 10–11 with only raised line beneath. Clypeus obtusely pointed beneath, yellow with a narrow black central stripe. Coxae 1–2 yellow beneath, femora 1–2 with an anterior yellow spot at base. Wings dark brown, length 21·0 mm. Uganda, Burundi, Zaire *B. leonhardii* R. du Buysson (p. 87)
- Thorax and gaster without dense, brassy tomentum 25
- 25(24) Antennal segments 4 and 5 each clearly less than twice as long as broad.
Antennae ferruginous, segment 12 curved, hardly flattened, longer than 5. Clypeus ventrally, though pointed, not much protruding. Mesoscutum, scutellum, metanotum and propodeum with short, stout, curved bristles. Tibiae and tarsi ferruginous. Stalk of second gastral tergite not more than 1·5 times as long as broad. South Africa, Lesotho, Malawi, Zimbabwe, Tanzania *B. petiolata* (Degeer) (p. 71)
- Antennal segments 4 and 5 each more than twice as long as broad 26
- 26(25) Thorax and propodeum dorsally with dense, relatively long, black hairs.
Antennae except segments 1–3 dorsally, ferruginous; segment 12 a little flattened and curved, as long as 9; 9–11 elongate, not much prominent beneath. Legs black, femora and tibiae 1–2 or 1–3 with pale yellow stripes beneath. Gaster with more or less distinct protruding black bristles, stalk of second gastral sternite 2·0–2·5 times as long as broad. Ethiopia *B. meneliki* Gribodo (p. 52)
- Thorax and propodeum without such dense long black hairs 27
- 27(26) Stalk of second gastral tergite not more than 1·5 times as long as broad.
Antennae usually entirely ferruginous 28
- Stalk of second gastral tergite 2–3 times as long as broad 31
- 28(27) Gaster posteriorly with short black bristles protruding from the tomentum. Clypeus usually not or little yellow-marked; body except the head usually black or very dark ferruginous. Wings light to dark brown, tips a little darker, length about 19·0 mm.
Antennal segment 12 moderately flattened and curved, about as long as 9. Kenya, Uganda, Zambia, Angola, Zaire *B. pennata* sp. n. (p. 51)
- Gaster without bristles in the tomentum or in *B. lateritia* only with very short ones. Clypeus with whitish or yellow side-stripes. At least the legs ferruginous. Wings yellowish brown, with dark tips (except in *B. tarsata*), length 16·5–19·0 mm. 29

- 29(28) Tarsi shortened, mid and hind pairs shining, without any hairs or bristles.
Two small spots on gastral tergite 2, yellow. Wings light fuscous, length 17.5 mm. Stalk of second gastral tergite as long as broad. Thorax and propodeum black, former not punctured. Tanzania *B. tarsata* Kohl (p. 73)
- Tarsi not shortened, mid and hind pairs not so shining with numerous small bristles 30
- 30(29) Antennal segment 12 slightly flattened, distinctly curved, as long as segment 9; 10–11 with gently raised elongate prominences. Second gastral tergite sometimes with narrow yellow spots.
Mesoscutum, mesopleuron and propodeum, gastral tergites 3–7 more or less blackened; segments 1–2 ferruginous. Kenya, Tanzania, Zambia, Angola, South Africa *B. freyi* R. du Buysson (p. 69)
- Antennal segment 12 cylindrical, strongly curved, at least as long as 5; 10–11 not all raised beneath. Gastral tergite 2 with a large yellow spot.
Small area on the frons, gastral tergites 4–5 more or less blackened. Kenya, Zambia, Zimbabwe, Angola, Malawi, Mozambique, South Africa *B. lateritia* Gerstaecker (p. 72)
- 31(27) Gaster posteriorly with short black bristles protruding amongst the tomentum.
Antennae more or less blackened, segment 12 more or less flattened and curved, stalk of second gastral tergite 2.0–2.5 times as long as broad. Gaster rarely with two yellow spots 32
- Gaster posteriorly without black bristles amongst the tomentum, except sometimes at the extreme sides 34
- 32(31) Antennal segment 12 wider, more strongly flattened, moderately curved, especially above, as wide as segment 11 but a little longer than it; segments 9–11 with strong rounded protuberances beneath. Thorax and propodeum rather strongly punctured with relatively long black hairs. Clypeus sometimes not white at sides. Wings a little darkened. Kenya, Zambia, Tanzania, Malawi, South Africa (Natal, Orange Free State), Niger *B. somereni* sp. n. (p. 50)
- Antennal segment 12 narrower, less flattened, more curved and rather longer, as long as 9; 9–11 beneath with elongate, more or less raised protuberances beneath. Thorax without hairs. Clypeus white at sides (*B. juncea* (F.)) 33
- 33(32) Wings black with metallic reflections. Arabia, Algeria (Tripoli) (? strays), West Africa, Zaire, Uganda, Kenya, Malawi, Sudan *B. juncea juncea* (F.) (p. 48)
- Wings brownish with tips darker. Zaire, Uganda, Kenya, Malawi, Sudan *B. juncea colonialis* Kohl (p. 48)
- 34(31) Wings dark brown, tips hardly darker, veins reddish, length 17.0–18.0 mm.
Antennal segment 12 flattened, dorsal side curved, ventral side straight. Antennae and legs ferruginous 35
- Wings less dark and their colour usually less uniform 37
- 35(34) Whole mesosoma ferruginous. Mesoscutum and pleuron less punctured. Antennal segment 12 shorter, 9–11 cylindrical with stronger ventral prominences whose surfaces are curved. Apex of gastral tergite 2, whole of 3, base of 4, blackish; wide transverse spots on tergite 2, apical band of sternite 2, light yellow. Oman (Dhofar) *B. guichardi* sp. n. (p. 94)
- Mesosoma, except partly ventrally, black. Mesoscutum and pleuron more punctured. Antennal segment 12 longer, 9–11 little projecting below, with flattened elongate prominences. Gastral tergites 3–4 black 36
- 36(35) Antennal segment 12 broader and flatter. Antennal scape not yellow beneath. Gaster without yellow markings.
Mesopleuron less punctured. Ethiopia *B. abyssinica* du Buysson (p. 96)
- Antennal segment 12 narrower and less flattened. Antennal scape yellow beneath. Gastral segment 2 light ferruginous with apex of tergite and spots on sternite yellow. Socotra *B. saussurei* Kirby (p. 93)
- 37(34) Fore and mid tarsi shortened, segments 4 and 5 clearly shorter than on the hind pair.
Antennal segment 12 long, curved, cylindrical, a little longer than 11.
Antennal segments 10–11 with quite strong protuberances beneath. Ferruginous, mesoscutum and gastral segments 3–7 a little darkened. Clypeus with wide lateral white stripes; gastral tergites 2–4 and sternite 2 each with a pair of yellow spots. Fore and mid femora and mid tibia with yellow stripes beneath. Wings hyaline, tips dark, length 15.5 mm. Kenya, Uganda, Zambia, Tanzania (including Zanzibar), Malawi, Mozambique *B. facialis* du Buysson (p. 80)
- Fore and mid tarsi not shortened. Antennal segment 12 shorter, less curved, less cylindrical 38

- 38(37) Stalk of second gastral tergite 4·5 times as long as broad. Wings hyaline with ferruginous venation, length 17·0 mm.
 Largely ferruginous, femora somewhat darkened, gastral segments 2–7 blackish, 2 with two large contiguous yellow spots. Antennal segment 12 moderately flattened, a little curved above and below, segments 10–11 short with strongly protruding keels below.
 Cameroun *B. rothkirchi* von Schulthess (p. 85)
- Stalk of second gastral tergite 2–3 times as long as broad. Wings, except in the large *B. brunescens*, with more or less distinct dark tips 39
- 39(38) Large species, length 20·0–22·0 mm, uniformly light brown. Uniformly ferruginous, at most the mesoscutum and gastral tergites 3–7 a little darkened.
 Stalk of second gastral tergite 2 as long as broad. Antennal segments 9–11 with slight convexities beneath. Ethiopia and Africa south of the Sahara *B. brunescens* sp. n. (p. 70)
- Smaller species or not uniformly ferruginous. Wings usually with distinct dark tips 40
- 40(39) Mesoscutum with dense silvery tomentum more or less hiding the cuticle.
 Gena clearly narrower than eye in profile 41
- Mesoscutum with much finer and less dense tomentum, leaving the cuticle, which is very little punctured, exposed 43
- 41(40) Mesosternum with long black hairs in front of mid coxa.
 Mesoscutum and propodeum with dense, moderately long hairs. Antennal segment 12 as in *B. grisea* but rather shorter, segment 9 with a strong angular protuberance beneath. Femora 1 and 2 usually with yellow stripes beneath. Kenya, Tanzania *B. neavei* sp. n. (p. 89)
- Mesosternum without long black hairs in front of mid coxa 42
- 42(41) Antennal segment 12 cylindrical, as long as 8, slightly curved, segments 9–11 beneath with elongate, almost flat-topped elevations. Mesothorax (except scutellum), propodeum, gaster and mid and hind legs, practically black; mid and hind coxae beneath, strips on mid femur and tibia, large spots on gastral tergite 2, yellow. Zambia *B. bimaculata* sp. n. (p. 78)
- Antennal segment 12 somewhat flattened, as long as 8, more curved dorsally than ventrally; segments 8–9 with flat-topped elevation, 10–11 with angular protuberances, sometimes weak on 11. Mesothorax (except scutellum) usually more or less black, propodeum more ferruginous; base of gaster and femora ferruginous, only fore femur with a yellow stripe. Gastral tergite 2 with or without a pair of yellow spots. Chad, West, Central and South Africa *B. grisea* (F.) (p. 87)
- 43(40) Stalk of second gastral tergite usually twice as long as wide. Clypeus white, with a faint darker central stripe.
 Antennal segment 12 as long as 11, moderately flattened and curved; 10–11 with gently rounded protuberances beneath, prominence of 9 flatter. Thorax very feebly punctured. Ferruginous, sometimes gastral tergites 3–4 a little darker; sometimes narrow yellow spots at apex of gastral tergite 2. Wings reddish brown, tips a little darker. Yemen and Southern Yemen (Aden) *B. arabica* Giordani Soika (p. 96)
- Stalk of second gastral tergite 2·5–3·0 times as long as broad. Clypeal dark stripe more distinct 44
- 44(43) Ferruginous, gastral tergite 2 with two suffused yellow spots. Wings pale yellow-brown, length 15·0 mm.
 Antennal segment 12 moderately flattened, curved above, straight below, about as long as 7; 9–11 with strong but rounded protuberances beneath. Uganda, Zambia, Angola, South Africa, Tanzania *B. longitarsus* sp. n. (p. 97)
- At least gastral tergites 3–4 more or less darkened. Wings dark 45
- 45(44) Antennal segment 12 cylindrical, curved, very little flattened; segment 11 with an angular prominence.
 Antennal segment 9 with a flat prominence, 10 with an angular one. Ferruginous, gastral segments 3–7 usually blackish; apparently tergite 2 sometimes with yellow spots. SW. Saudi Arabia *B. filiformis* (de Saussure) (p. 100)
- Antennal segment 12 rather more flattened and less curved, 11 with a feeble prominence 46
- 46(45) Wings blackish. Much of gaster blackish, segment 2 without yellow spots.
 Head dorsally, mesosoma, blackish. Clypeus with wide lateral white stripes. Ethiopia *B. abyssinica* R. du Buysson (p. 96)
- Wings considerably paler. Gastral segments 3–7 black, segment 2 with narrow yellow spots (*B. adenensis* Giordani Soika) 47
- 47(46) Mesoscutum and propodeum sometimes darkened. Whole of clypeus except ventral margin

- whitish yellow. Wings yellow-brown, tips light fuscous. Yemen and Southern Yemen (Aden) *B. adenensis adenensis* Giordani Soika (p. 99)
- Mesothorax (except pronotum, scutellum, metanotum and propodeum) black. Wings yellow-brown, tips dark fuscous. Somalia *B. adenensis somaliensis* subsp. n. (p. 100)

Key to Malagasy species of *Belonogaster*

- 1 Stalk of second gastral tergite half as long as broad or a little longer. Gastral petiole swollen distally.
Black; wings pale brown, length 18·0–20·0 mm. Female antenna with segments 4, 5 and 6, 1·1, 1·0 and 0·9 times as long as broad. Male mandibles and clypeus with dense outstanding white pubescence, clypeus below feebly produced; antennal segment 12 elongate, as long as 8, subcylindrical, quite strongly curved with numerous short hairs, 4–9 black, 10–12 light brown, 9–12 successively a little thinner *B. brevipetiolata* de Saussure (p. 101)
- Stalk of second gastral tergite at least clearly longer than broad. Gastral petiole not or only very gradually swollen distally 2
- 2(1) Very large, wing-length 25·0–29·0 mm. Disk of frons with outstanding black bristles. Genal margin to near or beyond the bottom of the eye. Practically no bristles beneath the femora. Tomentum very sparse, denser on posterior gaster but there very fine. Uniform brown, ♀ stalk of second gastral tergite 2·5, of ♂ 1·7 times as long as broad. Male antennal segment 12 moderately flattened and curved, black, a little shining beneath
B. guerini (de Saussure) (p. 102)
- Smaller, wing-length not more than 21·0 mm 3
- 3(2) Stalk of second gastral tergite 3·5–4·0 times as long as broad. 4
- Stalk of second gastral tergite not more than 3 times as long as broad 6
- 4(3) Females (unknown in *B. keiseri*).
Light brown, clypeus and legs beyond the coxae rather paler. Wings brownish hyaline, length 11·0–14·0 mm. Disk of frons with rather fine outstanding brown bristles. Genal margin ending rather before the bottom of the eye. Tomentum very sparse, denser on posterior gaster but very fine. Femora with fine hairs beneath. Scutellum, metanotum and propodeum with numerous fairly long brown hairs. Valves of propodeum pale yellowish with a transparent, oval 'eye'-mark above it *B. madecassa* (de Saussure) (p. 103)
- Males 5
- 5(4) Yellowish ferruginous, head, legs and gaster beneath yellower. Wings hyaline, length 11·0 mm. Clypeus below gently rounded with moderately long and dense white hairs. Mesoscutum and femora beneath with no tomentum. Antennal segments 4–5 about 3 times as long as broad; 12 short (not quite as long as 8), flattened, a little widened to apex, tip narrowly black with a few short hairs; 8–11 beneath with protruding flat, table-like projections *B. madecassa* (de Saussure) (p. 103)
- Brownish ferruginous, most of mandibles, face below antennal sockets, legs except coxae, more or less dark brown. Malar space and gena, band across pronotal keel, lateral sclerites of scutellum, most of metanotum, valves and large posterior area on propodeum, mesopleural spot, pale yellow; fore coxa and femur, mid femur, tibiae and tarsi with creamy yellow marks. Wings light brownish hyaline, length 11·5 mm. Clypeus projecting below in a rounded obtuse angle with dense outstanding hairs at sides. Mesoscutum with some long hairs, femora with fine pile rather than tomentum beneath. Antennal segments 4–5 about 3·5 times as long as broad, 12 narrow, considerably flattened, as long as 11 which is cylindrical, 8 a little more than 2·5 times as long as broad, 9–12 considerably longer and thinner, 6–10 with raised lines beneath *B. keiseri* sp. n. (p. 104)
- 6(3) Wing-length 17·0–21·0 mm. Stalk of second gastral tergite usually 3 times as long as broad, 2·5 times in *B. apicalis* ♂ 7
- Wing-length 10·0–16·5 mm. Stalk of second gastral tergite not more than 2·5 times as long as broad.
Mesoscutum granulate, not punctured 10
- 7(6) Bristles of mesosternum and fore coxa beneath, black.
Antennal segment 3 clearly longer than 4 + 5. Wings yellowish hyaline, length 20·0 mm. Mid and hind femora (in good condition) with numerous hairs beneath. Ferruginous; scape greenish black, coxae, femora, sometimes fore tibiae, black; gaster black, tergites 4–6 more or less ferruginous suffused. Mid and hind tibiae and sometimes fore

tibia, all tarsi, ochreous. Stalk of second gastral tergite blackish, slightly shorter than in *B. prasina*. Male not seen *B. bicolor* de Saussure (p. 104)

— Bristles of mesosternum and fore coxa pale or at most partly brown 8

8(7) Mid and hind femora with no hairs beneath. Wing-length 17.0–21.0 mm.

Female antennal segment 3 a little longer than 4 + 5. Light ferruginous, frons, humeri, part of mesoscutum and sometimes scutellum, gastral petiole and anterior part of tergites 2–3, part of mid and sometimes hind femora, blue-green.

Male with sides of clypeus, base of mandibles with dense outstanding white hairs. Clypeus roundly produced below. Antenna with segments 1–9 light brown, 10–12 black, 8 and 9 black marked beneath, segment 12 shining, curved, subcylindrical, 10–11 with a strongly raised ridge beneath projecting a little at apex. Fore and mid tarsus with segments rather short and broad *B. prasina* de Saussure (p. 107)

— Mid and hind femora with quite conspicuous hairs as well as tomentum beneath. Wing-length 16.5–18.5 mm. Males not seen 9

9(9) Antennal segment 3 distinctly longer than 4 + 5. Wings dark grey with tip largely light red-brown. Black, mandibles pitchy, ventral quarter of clypeus dark ferruginous. Antennae ferruginous, segments 1–3 darkened above. Tarsi more or less reddened. Stalk of second gastral tergite more or less ferruginous *B. apicalis* de Saussure (p. 105)

— Antennal segment 3 a little longer than 4 + 5. Wings red-brown, tips if anything, paler. Ferruginous, frons, mesosoma, coxae and femora, gastral petiole and stalk of second gastral tergite somewhat darkened. Gaster sometimes vaguely darkened

B. maromandia sp. n. (p. 108)

10(7) Females 11

— Males 12

11(10) Hind tibia pale yellow with apex black. Mesosoma with surface granulate, not punctured, ferruginous, large part of humeri, mesoscutum and upper part of propodeum, black. Gaster black, tergites 2–6 with yellow apical bands spreading along the sides. Four hind coxae, all femora, four hind tarsi, black; tibiae yellow. Wings very pale brownish hyaline, length 12.0–13.5 mm *B. hildebrandti* de Saussure (p. 108)

— Hind tibia of uniform colour, usually black but sometimes reddish. Thorax generally with a few distinct punctures, probably always some on pleuron. Colour usually light reddish brown but there is also a form which is largely blackish. Gaster usually not banded, but rarely a linear band on tergite 2. Wings hyaline, length 13.0 mm

B. eumenoides de Saussure (p. 110)

12(10) Wings hyaline, length 12.0 mm. Anterior streaks on all femora, all tibiae, traces of bands at sides of gastral tergites 3–4, yellowish. Stalk of second gastral tergite about 2.5 times as long as broad. Antennae a little shorter, segments 8–12 shining beneath, 12 cylindrical, curved, as long as 8. Gastral petiole with distal part distinctly widened

B. hildebrandti de Saussure (p. 108)

— Wings light brown, length 12.0 mm. Head light ferruginous brown, mandibles, malar space, narrow streak on gena, wide stripes from mid sinus to bottom of clypeus, whitish yellow. Spot above antennal sockets, antennal segments 1–2 beneath, basicostal plate, anterior streaks on femora 1–2, anterior streaks on all tibiae, narrow end and sides of gastral tergite 2, narrow end of sternite 2, broad streaks on coxae beneath, meso- and metasternum, broadly, tip of pronotum below, creamy. Mid and hind tibiae blackish brown above. Stalk of second gastral tergite 2 as long as broad. Antennae longer, 6–10 with feeble raised lines beneath, 9–11 not shining beneath, segment 12 of similar shape but longer, as long as 9, traces of a division (into 12 and 13) rather before the middle. Gastral petiole with distal part widened *B. eumenoides* de Saussure (p. 110)

Descriptions of African species

Belonogaster juncea (F.)

(Figs 1–5)

Vespa juncea Fabricius, 1781: 468.

Raphigaster junceus (Fabricius) de Saussure, 1853: 14, pl. 2, fig. 2.

Belonogaster junceus (Fabricius) Gerstaecker, 1862: 468.

This is a common species in tropical Africa and occurs in two forms, the nominotypical one with darker wings in more northern parts and a subspecies with lighter wings in the south. De Saussure includes *B. juncea* in his conspectus of the species of Madagascar but I know of no reliable record from that island.

Belonogaster juncea juncea (F.)

Vespa juncea Fabricius, 1781: 468. Holotype ♀, AFRICA AEQUINOCTIALI (Banks coll., BMNH) [examined].
?Vespa guineensis Fabricius, 1793: 277. Holotype ♀, GUINEA (Isert coll., Kiel) [not examined].

FEMALE. Head ferruginous; antennal segments 1–7 darkened above. Mesosoma ferruginous, dorsal part of humeri and mesoscutum darkened. Legs ferruginous, tibiae 2–3 a little darkened, tarsi black. Gaster dark ferruginous, tergites 2–6 gradually more blackened. A very few ♀ in West Africa have two small yellow spots on gastral tergite 2. Wings black with purple reflections, length 17.0–23.5, mean (156 ♀) 20.35 mm.

Clypeus (Fig. 3) acute below, ventral quarter shining with scattered large punctures bearing short black bristles, dorsal part finely granulate, dull with more but smaller punctures and with very short black bristles and not very dense white tomentum. Frons with fairly close small punctures and outstanding black bristles, also rather sparse white tomentum. Gena not quite as wide as eye in profile. Antenna (Fig. 1) with segment 3 clearly longer than 4 + 5, 4 and 5 about 1.5 times as long as broad, 8 quadrate. Base of submentum and stipes with a few short black bristles. Mesoscutum and humeri finely granulate dull, with many small punctures and close silvery tomentum, mesopleuron similar; scutellum and metanotum with rather closer and stronger punctures, former with a strong impressed central line. Propodeum (Fig. 4) dull, very finely granulate, dorsally striate, sides punctured, tomentum close and silvery, bristles outstanding, short and black, posterior depression nearly half the dorsal length of propodeum, impressed line strong for two-thirds of length, anterior depression rather large, shallow. Last segment of the foretarsus long. Femora beneath with pale tomentum and not many short outstanding black or brown bristles. Gastral petiole relatively short and stout, a little widened at apex, spiracles little projecting, hairs sparse. Stalk (Fig. 5) of second gastral tergite 2–3 usually 2.5 times as long as broad. Gaster posteriorly with rather close pale tomentum through which numerous short black bristles protrude.

MALE. Very like the female; dorsal streak on mandibles, sides of clypeus, inner orbits, anterior streak on scape, yellow. Two males with two small yellow spots on gastral tergite 2. Wing-length 15.5–22.0, mean (42 ♂) 19.12 mm.

Gena distinctly narrower than eye in profile. Antenna (Fig. 2) with segment 3 about as long as 4 + 5, 4 more than, 5 = 2.5 times as long as broad, 8 twice as long as broad, 9–11 a little but usually not strongly prominent below, 12 flattened and curved with a few short bristles on the underside. Stalk of second gastral tergite 1.5–2.5 times as long as broad, usually 2. Bristles on the gaster sometimes less distinct.

DISTRIBUTION (599 ♀, 130 ♂). **India** (2 ♀, Rajasthan, Jaisalmer, 14.ix.1979, *G. Popov*), **Saudi Arabia** (Mahidh), **Libya** (Tripoli), **Ethiopia, Sudan, Rwanda** (Benoit, 1956: 352), **Chad, Mali, Senegal, Gambia, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin Republic, Nigeria, Cameroun** (including Sao Thomé), **Gabon, Congo, Zaire, Angola, Zimbabwe, Zambia, Kenya, Uganda, Malawi, Mozambique, Tanzania** (including Zanzibar), **South Africa** (Transvaal).

The subspecies seems to be rare or perhaps very local in the northern desert regions. In the south it intergrades with subsp. *colonialis* but specimens of the true subsp. *juncea* seem to occur occasionally right down to Zanzibar.

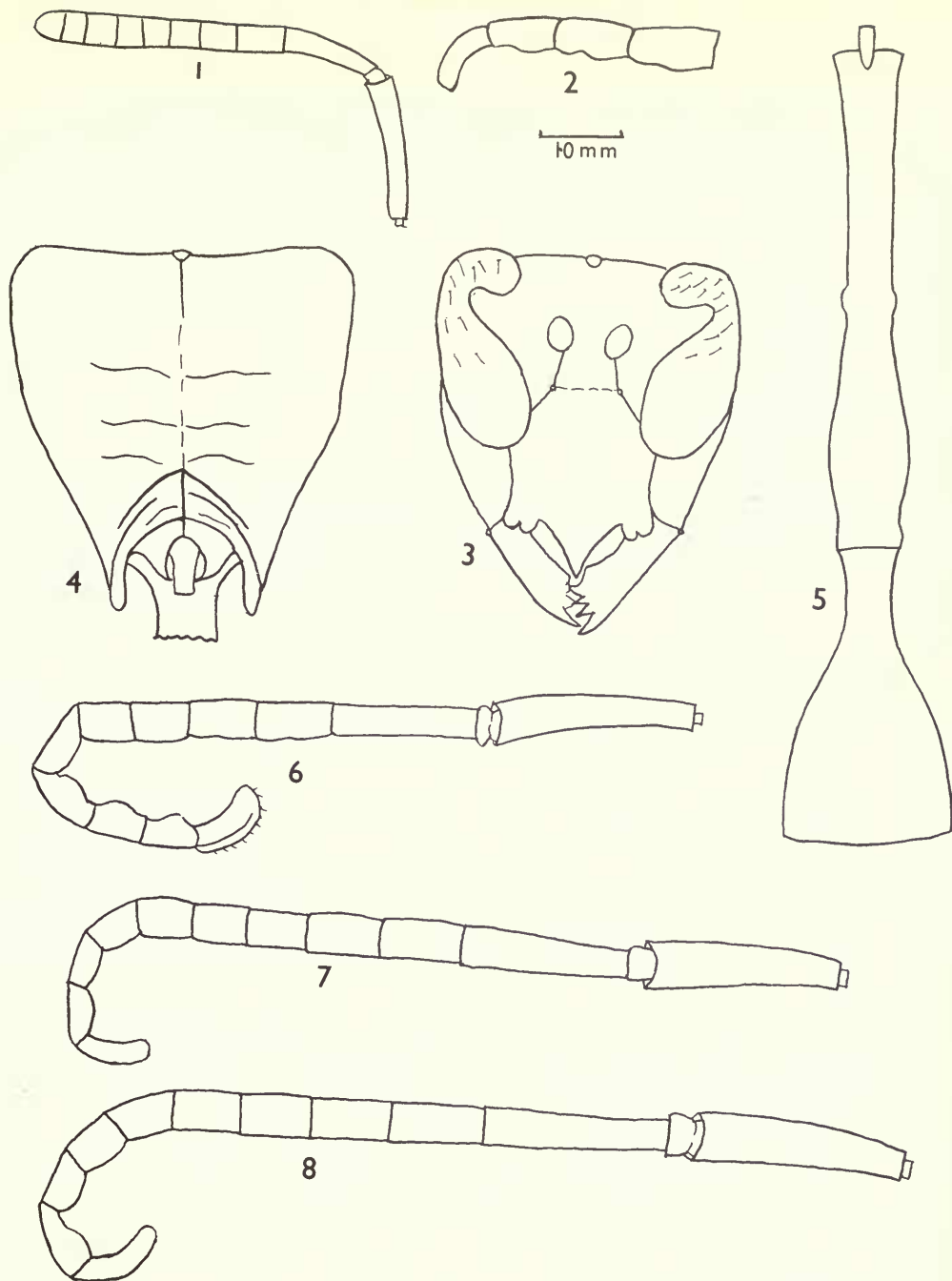
In the Salt coll. (BMNH) there are 1 ♂, 5 ♀, of this subspecies which are stylized. The adult is little modified.

Belonogaster juncea colonialis Kohl stat. n.

Belonogaster colonialis Kohl, 1894: 320, 323, pl. 11, figs 72, 84, pl. 17, fig. 132. LECTOTYPE ♂, TANZANIA: Dar-es-Salaam, 1893 (*R. Pachinger*) (NM, Vienna), here designated [examined].

Like *B. j. juncea* but the wings are usually much less darkened and lack the purple reflections. The degree of darkening of the wings varies a good deal and the two forms more or less intergrade. As in *j. juncea* yellow spots on the gaster are rare and occur more often in the ♀ and more in the northern part of its range. There may be small round spots on gastral tergite 2, or 2–3, or 2–4. These are usually accompanied by a small spot on sternite 2.

DISTRIBUTION (134 ♀, 27 ♂). **Congo, Zaire, Angola, Zambia, Uganda, Kenya, Malawi, Zimbabwe, Tanzania** (including Zanzibar), **Mozambique, South Africa** (Transvaal, Natal).



Figs 1-8 *Belonogaster*. 1-5, *B. juncea juncea* (F.). (1) ♀, left antenna; (2) ♂, left antenna, segments 9-12; (3) ♀, clypeus; (4) ♀, propodeum; (5) ♀, gastral tergites 1-2. 6, *B. somerani* sp. n., ♂, left antenna. 7, *B. pennata* sp. n., ♂, left antenna. 8, *B. meneliki* Gribodo, ♂, left antenna.

Belonogaster somereni sp. n.

(Fig. 6)

MALE. Head ferruginous; small rings round ocelli, antennal segments 1–7 above, blackish; inner orbits to bottom of ocular sinus, sometimes sides of clypeus, creamy white. Mesosoma black; front of pronotum, subepimeral area, mesosternum, metasternum, valves and adjacent area of propodeum, ferruginous. Legs ferruginous, tibiae and tarsi black, hind femora somewhat blackened. Gaster black; petiole and nearly whole of segment 2 ferruginous, segments 3–4 very slightly reddened at apex; 1 ♂ with roundish yellow spots on tergite 2. Wings hyaline, slightly yellow-brown suffused, tips lightly infusate. Length 20.0 mm.

Clypeus below obtusely angled, tip hardly sharp, side with close silvery tomentum, with quite numerous large, shallow punctures with sparse outstanding black hairs. Frons dull with not very close shallow punctures with short black and longer pale outstanding hairs. Gena rather more than half as wide as eye in profile. Antenna (Fig. 6) with segment 3 as long as 4 + 5, 4 longer than 5, more than 2.5 times as long as broad, 8 rather less than twice as long as broad, 9–11 with strong shining humps beneath, 4–8 with shining raised lines beneath, 12 about as long as 9, 10 and especially 11 a little shorter, 12 much flattened (more than in *B. juncea*), outside shining, dorsal edge curved, ventral edge nearly straight but slightly concave. Whole mesosoma with dense silvery tomentum and whole upper side with quite dense, outstanding black and greyish hairs; hairs on propodeum black, longer and denser. Mesoscutum with a few small punctures at sides and in front, rather more numerous on mesopleuron; scutellum and metanotum with stronger punctures than mesoscutum. Propodeum with posterior depression nearly half its dorsal length, impressed line feeble, anterior depression small and narrow but deep; surface of propodeum with dense strong punctures and some striae on the angles. Mid and hind femora with rather dense white tomentum beneath. Front tarsi with segment 5 long. Gastral petiole long and narrow, not widened behind, spiracles little protruding. Stalk of second gastral tergite about 2.5 times as long as wide; gaster posteriorly with dense silvery-greyish tomentum and a number of protruding short black bristles.

FEMALE. Very like male but face not pale-marked, antennal segments 3–11 dark above. Gaster with segments 1–2 ferruginous, narrow apex of 2 black, 3–5 black, 6 reddish. Wings brown, tips hardly darker, length 10.0–20.0 mm.

Clypeus acute below, finely reticulate with scattered large punctures and subappressed black bristles. Frons dull, reticulate with close moderate sized punctures and many outstanding black hairs. Gena a little wider than eye in profile. Antenna with segment 3 much longer than 4 + 5, 4 and 5 a little longer than broad, 8 quadrate. Whole mesosoma with dense silvery tomentum but no outstanding hairs except on propodeum, punctures small and indistinct except on mesopleuron. Propodeum with angles punctate-striate. Mesosternum with rather conspicuous black bristles in front of mid coxae. Hind femora with numerous short black bristles in front of mid coxae. Hind femora with numerous short black bristles beneath. Gastral petiole moderately long, a little widened behind. Stalk of second gastral tergite 2.5 times as long as broad; posterior tergites with dense greyish tomentum and short protruding black bristles.

Holotype ♂, **Kenya**: Teita Hills (ca 38°3'E, 2°4'S), viii.1947 (*V. G. L. van Someren*) (BMNH).

Paratypes. **Kenya**: 1 ♂, same data as holotype (BMNH). **Tanzania**: 1 ♀, Lake Prov., Old Shinyanga, window, 8.iv.1958 (*O. W. Richards*) (BMNH); 1 ♀, West Kilimandjaro, Ngare-Nairobi, 4500 ft [1370 m], iv.–v.1937 (*B. Cooper*) (BMNH); 1 ♀, Kilimandjaro (*Raurige*) (RNH, Leiden); 1 ♂, Maranga, 11.vii.1978 (*H. R. Feijen*) (ITZ, Amsterdam). **Zimbabwe**: 1 ♀, Salisbury, i.1906 (*G. A. K. Marshall*) (stalk of gastral tergite 2 short, 1.5 times as long as broad) (BMNH). **Zambia**: 1 ♀, Lake Bangweolo, Chishi I., 3800 ft [1160 m], 3.vi.1908 (*S. A. Neave*) (UM, Oxford); 1 ♂, 2 ♀, N. of Lake Bangweolo, Lawingu, 4200 ft [1280 m], 10.i.–13.vii.1908 (*S. A. Neave*); 1 ♂, 1 ♀, Lake Chambezi, Kasama district, 3900 ft [1190 m], 4–8.vi.1908 (*S. A. Neave*); 4 ♀, Chinsali district, 4300 ft [1310 m], 9.iv.–3.v.1908 (*S. A. Neave*) (UM, Oxford). **Malawi**: 1 ♀, Zomba, 1915 (*H. Stannus*) (BMNH); 1 ♂, Zomba, 10.iii.1974 (*H. R. Feijen*); 3 ♂, Limbe Maone, 10.v.1973, 7.vi.1973 (*H. R. Feijen*); 3 ♂, Ntchisi Forest, 21.viii.1974, 21.ix.1974 (*H. R. Feijen*); 1 ♂, Ntocha Forest, 21.viii.1974 (*H. R. Feijen*); 1 ♂, Cape Maclean, 18.iv.1973 (*H. R. Feijen*); 1 ♂, 1 ♀, Chelinda, 25.ii.1972 (*H. R. Feijen*); 1 ♂, Liwonde, 24.iv.1975 (*H. R. Feijen*); 1 ♀, Salima, 25.ii.1975 (*C. G. Schulten*); 1 ♂, Chumbe, 1.vi.1972 (*C. G. Schulten*) (ITZ, Amsterdam). **Mozambique**: 1 ♂, Maputo, 1.v.1977 (*H. R. Feijen*); 1 ♂, Maxaquin, 1.v.1977 (*H. R. Feijen*) (ITZ, Amsterdam). **South Africa**: 2 ♂, Natal, Durban, iv.1896–99 (*F. N. Brown*) (UM, Oxford); 1 ♂, Natal, Howick, 3000–4000 ft [900–1200 m], 1895–99 (*F. N. Brown*) (no yellow spots on gastral tergite 2); 1 ♂, Orange Free State, 4000–5000 ft [1200–1500 m], i.–iii.1896 (*F. N. Brown*) (UM, Oxford). **Niger**: 3 ♀, Air, Mts, Baguezane, 1200–1300 m, 26–31.viii. (*L. Chopard, A. Villiers*) (MNHN, Paris).

Belonogaster pennata sp. n.

(Fig. 7)

FEMALE. Black; head ferruginous, centre of frons black; antennae darkened, especially above; legs blackish ferruginous. A few specimens considerably ferruginous tinged. Wings brownish ferruginous, tips fuscous, length 20.0 mm.

Clypeus acute below, very finely reticulate, more shining below with a few scattered punctures and dorsally with a few dark oblique bristles. Frons with fairly numerous punctures and short outstanding bristles. Gena about as wide as eye, shining below, with very few punctures. Antennal segment 3 not quite as long as 4 + 5 + 6, 4 and 5 about 1.5 times as long as broad, 8 about quadrate. Mesosoma and gaster with close silvery grey tomentum. Mesoscutum usually not very distinctly punctured, but distinct oblique short black bristles, mesopleuron, scutellum and metanotum more distinctly punctured. Propodeum distinctly punctured, angles punctate-striate, with short, stout oblique bristles, posterior depression nearly half as long as propodeum, no impressed line, anterior depression small and deep. Hind femora beneath with tomentum and some short black bristles. Fifth segment of fore tarsus long. Gastral petiole stout but little widened posteriorly, spiracles not prominent, tomentum dense, sometimes black bristles at sides. Stalk of second gastral tergite about 1.5 times as long as broad. Gaster posteriorly with distinct short black bristles protruding through the tomentum.

MALE. Very like the female, wing length ca 20.0 mm. Orbits, sides of clypeus, spot between antennal sockets, more or less white-marked, sides of clypeus often not much so. Clypeus much less acute below. Antenna (Fig. 7) with segment 3 a little longer than 4 + 5 which are each about 2.5 times as long as broad, 8 twice as long as broad, 6–8 with a shining line beneath, 9 and to a less extent 10 convex and shining beneath, 11 almost cylindrical, 12 a little flattened, well curved, tip rounded.

Holotype ♀, **Zaire:** Shaba prov. (Katanga), Kambove, 4000–5000 ft [1220–1500 m], 13.ii.07 (*S. A. Neave*) (BMNH).

Paratypes: **Gabon:** 1 ♀, Pays Mandja, Bassin du Chari, 1904 (Mission Chad-Chari, *Dr J. Decorse*) (MNHN, Paris). **Congo:** 1 ♀, Mbomo, Route Odzala, 21.ix.1977 (*S. Kelner-Pillaut*); 4 ♀, Brazzaville, 1907 (*E. Roubaud, J. Weiss*); 1 ♀, Bokomé, Village de Karamaion, 1905 (*Capn^{ne} Fourneau*); 3 ♂, 2 ♀, Congo (*Dybowskii*) (MNHN, Paris). **Zaire:** 1 ♂, Shabah prov. (Katanga), Kambove, 4000–5000 ft [1220–1500 m], 5.vii.1907 (*S. A. Neave*); 1 ♀, Shabah, Dilolo, 24–7.vii.1931 (*J. Ogilvie*); 1 ♂, 1 ♀, Shabah, Lualaba R., 2500–4000 ft [760–1220 m], 21.iv.1907 (*S. A. Neave*); 1 ♂, 150–200 miles [240–320 km] N. of Kambove, 3500–4500 ft [1060–1370 m], 4.x.1907 (*S. A. Neave*) (BMNH); 3 ♀, Garamba, 29°40'E, 4°10'S, vi.vii.1912 (*Lang-Chapin*) (USNM, Washington); 1 ♀, Lubumbashi (Elisabethville), 25.viii.1932; 1 ♀, Shabah, Kwatabala, 9.vii.1957 (*H. W. Croockewit*) (ITZ, Amsterdam). **Rwanda:** 4 ♀, Kisenyi, 4.ix.1958 (*J. Pasteels*) (USNM, Washington). **Angola:** 4 ♀, Salazar, 9–15.iii.1972 (Southern African Exped.); 1 ♀, Luimbali, Mt. Moco, 1800–1900 m, iii.1934 (*K. Jordan*) (BMNH). **Kenya:** 1 ♀, Nasisi Hills, 20 miles [32 km] N. of Mumias, 4800 ft [1460 m], 14–15.vi.1911 (*S. A. Neave*); 1 ♀, Nairobi (*Loveridge*); 2 ♀, Nairobi, i.1956 (*F. J. Jackson*) (BMNH); 2 ♀, Ngong Forestry Station, 13–18.i.1968 (*Krombein & Spangler*) (USNM, Washington). **Uganda:** 1 ♂, 3 ♀, Eastern Mbale distr. S. of Mt. Elgon, 3700–3900 ft [1130–1190 m] 2–5.viii.1911 (*S. A. Neave*); 2 ♀, between Jinja and Busia, E. Busoga, 3800–4000 ft [1160–1220 m], 28.vii., 1.viii.1911 (*S. A. Neave*); 2 ♀, Sitroko R., W. foot of Mt Elgon, 3600 ft [1100 m], 12–14.viii.1911 (*S. A. Neave*); 8 ♀, Torroro distr., Sukulu, iv.1961 (*E. Burtt*); 2 ♀, Kigezi distr., 6000 ft [1830 m], 19.xi.1934 (*J. Ford*); 1 ♀, Entebbe, ii.1912 (*C. A. Wiggins*); 1 ♀, Lango, viii.1934 (*D. R. Buxton*) (BMNH). **Tanzania:** 1 ♂, Malagarasi, Moyonasi, 29.vii.1950 (*D. Vesey Fitzgerald*); 1 ♀, N. Shore, Lake Manyara, ii.–v.1930 (*B. Cooper*) (BMNH); 1 ♀, Morogoro, 1963 (*Brother Ananias-Denis*) (ITZ, Amsterdam). **Zambia:** 1 ♀, Lake Bangweolo, Chishi I., 3800 ft [1160 m], 3.vi.1908 (*S. A. Neave*) (UM, Oxford); 1 ♂, 2 ♀, north of Lake Bangweolo, Lawingu, 4200 ft [1280 m], 13.vii.1908 (*S. A. Neave*); 1 ♂, 1 ♀, Lake Chambezi, Kasama district, 3900 ft [1190 m], 4–8.v.1908 (*S. A. Neave*); 4 ♀, Mid Chambezi Valley, Chinsali district, 4300 ft [1310 m], 9.iv.–3.v.1908 (*S. A. Neave*); 1 ♀, Lofu River, 4000 ft [1220 m], 8.viii.1908 (*S. A. Neave*) (UM, Oxford); 4 ♂, 14 ♀, Abercorn, i.1951–ii.1952 (*F. O. Albrecht*); 1 ♀, Niumadzi R., near Nawalia, 2000 ft [610 m], 17–22.viii.1910 (*S. A. Neave*) (BMNH). **Malawi:** 1 ♀, Blantyre, 1911 (*Dr J. E. S. Old*); 1 ♀, Zomba, 1915 (*H. S. Stannus*); 1 ♀, Chiromo, 1917 (*R. C. Wood*); 1 ♀, Bowa district, 1918 (*J. B. Davey*) (BMNH); 1 ♀, Nkata Bay, 27.ii.1974 (*H. R. Feijen*); 2 ♀, Nchisi Forest, 25.iv.1974, 25.viii.1974 (*H. R. Feijen*); 2 ♀, Salima Beach, 25.ii.1975, 17.iii.1970 (*C. G. Schulten*) (ITZ, Amsterdam). **Zimbabwe:** 1 ♂, Salisbury, iv.1899 (*G. A. K. Marshall*) (BMNH); 1 ♂, Victoria Falls natl. Park, 3–6.iv.1968 (*P. Spangler*) (USNM, Washington). **South Africa:** 1 ♂, Cape of Good Hope, Ft Beaufort, iii.1953 (*J. S. Taylor*) (USNM, Washington).

In the MNHN, Paris, some specimens of this species were found in the series of *B. grisea* var.

fuscipennis du Buysson and *R. brunnea* Ritsema. In my opinion both these series included five distinct species.

Belonogaster ferruginea sp. n.

FEMALE. Ferruginous; antennae black except for the scape beneath, ocellarium black. Mesoscutum marbled with black. Stalk of second gastral tergite more or less black. Tibiae and tarsi black. Wings reddish brown, tips not darker, length 21.0 mm.

Clypeus acute below, moderately shining-reticulate with many scattered large punctures bearing black bristles, a little pale tomentum, inner orbit with a yellow spot. Frons dull, closely punctured with outstanding short black bristles, little pale tomentum. Gena not quite so wide as eye in profile, reticulate with many moderate sized punctures. Antennal segment 3 as long as 4 + 5 + half 6, 4 + 5 a little but not much longer than broad, 8 quadrate. Mesoscutum and humeri with many rather small punctures, the former with some short hairs, tomentum very short, brownish and not very dense. Mesopleuron quite closely punctured with sparse tomentum. Scutellum and metanotum distinctly punctured. Propodeum with many rather coarse punctures, traces of striae dorsally, a little pale tomentum and below a few short hairs, posterior depression half as long as propodeum, impressed line rather distinct and nearly complete, anterior depression large and deep. Fifth segment of the fore tarsus long. Hind femur only with fine tomentum beneath. Gastral petiole short, stout, very shining, little widened posteriorly, a few short hairs. Stalk of second gastral tergite 1.5 times as long as broad. Gaster posteriorly with moderately dense pale tomentum with short black bristles protruding through it.

MALE. Not seen.

Holotype ♀, **Grande Comore**: La Grille (Guiri), 850–900 m, 15.xi.1973 (*L. Matile*) (MNHN, Paris).

Paratype. 1 ♀, same data as holotype (MNHN, Paris).

This species is very close to *B. pennata* but it has no black bristles beneath the hind femur and the gastral petiole is stouter and less hairy. The Comoro Is. are much nearer to Africa than to Madagascar.

Belonogaster meneliki Gribodo

(Fig. 8)

Belonogaster meneliki Gribodo, 1879: 242; du Buysson, 1909: 250, 265, pl. 7, fig. 1 (in part). Syntypes 2 ♀, ETHIOPIA: Shoa (Scioa), Mathal-Uonz (MCSN, Genoa).

I was sent 1 ♂, 1 ♀, from MCSN, Genoa and the ♀ (Scioa, *Antinori*, 1879) may well be one of the syntypes; the male was collected in the same region in 1881.

A box of specimens in MNHN, Paris, labelled *B. grisea meneliki* seemed to me to consist of six species: (5 ♂, 20 ♀), *B. meneliki*, all from Ethiopia; 5 ♀, *B. adenensis somaliensis* subsp. n.; 3 ♂, 5 ♀, *B. grisea* (F.); 2 ♂, 5 ♀, *B. juncea colonialis* Kohl; 7 ♂, 3 ♀, *B. freyi* du Buysson; 1 ♂, 2 ♀, *B. neavei* sp. n.. In my opinion *B. meneliki* is confined to, though widespread, in Ethiopia. The records by other authors (du Buysson, Bequaert, etc.) from other parts of Africa are, I think, in error.

FEMALE. Head ferruginous, antennae dark ferruginous, large frontal spot and head beneath black. Mesosoma, legs, gaster except petiole and base of tergite 2, black; scutellum and metanotum sometimes reddish. Wings red-brown. tips fuscous, length 17.0–20.0 mm.

Clypeus acute below, with scattered large punctures, on lower third shining with black bristles, upper two-thirds finely granulate. Frons with close rather large punctures and interstices finely reticulate with numerous outstanding short black hairs. Gena just wider than eye in profile, shining with a few small punctures below, reticulate with more numerous larger punctures above. Antenna with segment 3 as long as 4 + 5 + 6, 4 and 5 each a little longer than broad, 8 almost transverse. Thorax, especially mesopleuron with very distinct moderate-sized punctures, mesoscutum with dense, very fine, greyish tomentum and more or less distinct outstanding hairs. Propodeum with rather strong punctures and traces of striae on the angles, with long black hairs especially posteriorly, posterior depression about one-quarter as long as propodeum, impressed line more or less obsolete, anterior depression small but deep. Fifth segment of fore tarsi long. Hind femora with moderately numerous short black hairs beneath. Gastral petiole long, moderately thick, widened posteriorly, spiracles not very prominent. Stalk of second gastral tergite about 2.5 times as long as

broad. Gaster posteriorly with dense silvery tomentum and protruding through it more or less distinct black bristles.

MALE. Head ferruginous; mandibles, face except a narrow light brown central streak, scape beneath, creamy; frons and vertex, head beneath, antennae 1–3 above, black. Mesosoma black, scutellum and metanotum more or less reddish. Legs black, prosternum beneath, fore coxa, trochanter and femur beneath, spot beneath hind coxa, anterior spot at apex of and streak beneath apical quarter of hind femur, creamy. Last segment of front tarsi reddish. Gaster black, petiole and base of second tergite dark reddish. Wings reddish brown, tip large, length 18–19 mm.

Structurally very like ♀. Clypeus acute below, finely reticulate with very few punctures, silvery tomentum at sides, short black bristles on upper half of disk. Frons with short silvery hairs as well as the black ones. Gena rather narrower than eye. Antenna (Fig. 8) with segment 3 hardly longer than 4 + 5, 4 and 5 each about 2.5 times as long as broad, 8 just over twice as long as broad, 5–8 with raised lines beneath, 9–11 with elongate rounded protuberances beneath, 12 a little curved and flattened, end rounded, shining, as long as 8 or a little longer. Black hairs on mesosoma more developed. Hind femur with tomentum beneath but few or no bristles.

DISTRIBUTION (51 ♀, 12 ♂). **Ethiopia** (in mountains at 6000–11500 ft [1850–3500 m]): Shoa (i.e. round Addis Ababa), Simien, Jimma, Sidano, Harra, Diredawa, Eritrea (BMNH; MNHN, Paris; MCSN, Genoa; RNH, Leiden; ITZ, Amsterdam; USNM, Washington).

Dr Hugh Scott caught a ♀ visiting the crown of *Lobelia rhynchopetalum* at 11500 ft [3500 m], Arghine, Simien, 23.vi.1952 (BMNH).

Mons. M. de Rothschild caught a ♀ at Harrar with a ♂ strepsipterous puparium beneath gastral tergite 3 on the right.

Belonogaster kohli Schulz

(Fig. 9)

Belonogaster kohli Schulz, 1906: 322. Holotype ♀, FERNANDO PO: Malabo (Santa Isabel), 15.viii.1900 (*L. Conrad*) (BMNH) [examined].

FEMALE. Head ferruginous, ocellarium and antennal segments 3–6 above, darkened; lateral lobes of clypeus yellowish. Mesosoma ferruginous, darkened dorsally, propodeum sometimes with 2 yellow posterior spots; legs ferruginous; gaster ferruginous, segments 3–6 much darkened. Wings hyaline, costal stripe slightly brownish, length 15.0–16.0 mm.

Clypeus acute below, surface finely reticulate, lower quarter with shallow large punctures bearing brownish bristles, upper half duller, more granulate with sparse, very short, white tomentum. Frons with small rather sparse punctures, sparse pale tomentum and in front short black bristles. Gena a little narrower than eye, dull, reticulate; more shining below with a few small punctures. Bases of stipes and submentum with a tuft of long black bristles. Antenna with segment 3 much longer than 4 + 5, which are 1.5 or rather more times as long as broad, 8 a little longer than broad. Mesoscutum and humeri coarsely granulate with sparse inconspicuous small punctures, sparse pale tomentum, no hairs, mesopleuron similar, scutellum and metanotum rather more strongly punctured, former without an impressed line. Propodeum coarsely granulate, a few weak striae below, many outstanding black hairs, no distinct tomentum, posterior depression one-third as long as propodeum, impressed line very weak, anterior depression transverse, small. Last segment of fore tarsi a little shortened. Femora with scattered black bristles beneath, very little tomentum. Gastral petiole (Fig. 9) long and narrow, little widened posteriorly, spiracles moderately prominent, surface dull granulate with very fine tomentum and many long black hairs. Stalk of second gastral tergite (Fig. 11) 4.5 times as long as broad. Gaster posteriorly with close greyish tomentum and numerous protruding black bristles.

MALE. Not seen.

DISTRIBUTION. **Fernando Po:** 1 ♀, same data as holotype (MNHN, Paris). **Congo:** 1 ♀, Brazzaville, 1886; 1 ♀, Dimonika, 26.i.1971 (*J. Grillot*) (no yellow spots on propodeum) (MNHN, Paris); 1 ♀, ?Congo, Moumouna, 18.v.1971 (*C. Morin*) (no yellow spots on propodeum) (MNHN, Paris). **Uganda:** 1 ♀, Tero Forest, SE. Buddu, 3800 ft [1160 m], 26–30.x.1911 (*S. A. Neave*) (no yellow spots on propodeum) (BMNH).

Belonogaster dubia Kohl

(Figs 10, 11)

Belonogaster dubia Kohl, 1894: 322, 323, 329, pl. 15, figs 79, 94. LECTOTYPE ♂, TANZANIA: Dar-es-Salaam, 1893 (*R. Pachinger*) (NM, Vienna), here designated [examined].

Belonogaster occidentalis Tullgren, 1904: 455, pl. 25, fig. 4. LECTOTYPE ♂, CAMEROUN: Itoka, 20.i. (Sjöstedt) (NR, Stockholm), here designated [examined].

Belonogaster massaicus Cameron, 1910: 171. LECTOTYPE ♀, TANZANIA: Kilimandjaro, Kibonoto (Sjöstedt) (RM, Stockholm), here designated [examined]. **Syn. n.**

Although most specimens of this species are easily recognized by their large size, the yellow marked face of the ♀, the short stalk of the second gastral tergite and the bristles on the posterior gastral tergites, it is an unusually variable species and specimens occur in which these characters are not or only partially developed.

It also seems to be one of the species which has led to confusion in the fauna of Madagascar owing to the misidentification of unusual specimens of *B. dubia* as *B. guerini* de Saussure, a species which I believe is confined to Madagascar.

FEMALE. Ferruginous, often rather dark; clypeus including lateral lobes and inner orbits, spot between antennal sockets creamy white or yellow, the yellow occasionally reduced or even absent. Antennae dark, often almost black. Legs rather dark ferruginous, mid and hind tibiae darker, mid and hind tarsi black. Wings normally brown, occasionally pale or black, tips usually rather darker, length 23.0–26.5 mm.

Clypeus acute below, moderately shining, hardly reticulate with scattered fine punctures and short oblique dark bristles. Frons with fairly numerous, rather small punctures, outstanding black bristles and fine pale tomentum. Gena nearly as wide as eye. Antenna with segment 3 nearly as long as 4 + 5 + 6, 4 and 5 about 1.25 times as long as broad, 8 quadrate. Mesoscutum with numerous small punctures, more on the mesopleuron, tomentum pale, not very dense, humeri with very short, subappressed black bristles. Propodeum with strong striae on the angles, hairs short and not very dense, posterior depression half as long as propodeum, impressed line distinct, anterior depression small but deep. Posterior femora with white tomentum and a few pale bristles beneath. Gastral petiole moderately long, regularly but not very much widened to posterior end, spiracles little projecting. Stalk of second gastral tergite normally 1.5–2.0 times as long as broad, but occasionally 2.5 times. Posterior tergites with pale tomentum and normally more or less strongly protruded black bristles; but these bristles are sometimes paler or less prominent.

MALE. More ferruginous than the ♀. Sides of clypeus, inner orbits, spot between antennal sockets, scape beneath usually all whitish yellow or yellow. Antennae usually darkened above except on segments 10–12. Wings usually not so dark as in ♀, length 19.0–24.5 mm.

Clypeus (Fig. 11) more or less rounded below, at most with an obtuse point at centre, with scattered fine black bristles and little tomentum. Gena distinctly narrower than eye-width. Antenna (Fig. 10) with segment 3 about as long as 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 rather less, 4–9 with shining lines beneath, 10–11 cylindrical, 12 moderately flattened, end rounded-truncate, nearly straight below, distinctly curved above. Mesosoma with sculpture usually rather weaker than in ♀. Bristles on posterior tergites sometimes little developed or pale.

DISTRIBUTION (304 ♀, 69 ♂). Common over most of Africa south of the Sahara. **Senegal, Gambia, Guinea, Liberia, Ivory Coast, Ghana, Nigeria, Fernando Po, Niger, Congo, Zaire, Rwanda, Kenya, Uganda, Tanzania, Zambia, Malawi, Angola, Zimbabwe, Mozambique, South Africa** (Transvaal, Natal).

Two males (Zambia: Lake Bangweolo, 3800 ft [1160 m], north shore, 31.v.1908 and Chirui I., 5–7.vii.1908 (*S. A. Neave*) (UM, Oxford)) seem to be a form of this species but the clypeus below is sharply pointed and has less yellow at sides and has fewer black bristles; antennal segment 12 is more curved, less flattened and less widened to the apex.

Belonogaster ugandae sp. n.

(Fig. 12)

MALE. Ferruginous; dorsal streak of mandibles, face below antennal sockets except a rather narrow, pale brown, central stripe, pale yellow; ill-defined rings round ocelli blackish. Antennae black above, segments 1–2 and extreme rings round ocelli blackish. Antennae black above, segments 1–2 and extreme base of 3 yellow beneath, 3–9 ferruginous beneath, 10–11 light ferruginous (Fig. 12), 12 black. Legs ferruginous, coxae 1–2 beneath, mid trochanter and base of mid femur anteriorly, pale yellow. Mid, and to a greater extent hind femur darkened. Tarsi black, segment 5 of fore tarsi, proximal half of 5 on mid tarsi, pale brown. Gaster ferruginous. Wings dark reddish brown, tips darker, length 22.0 mm.

Clypeus beneath obtusely produced with the tip rounded; surface moderately shining, finely reticulate with scattered large punctures bearing fine black bristles, white tomentum very inconspicuous. Frons with

small, fairly close punctures, with outstanding black bristles. Eyes somewhat swollen, gena only about half eye-width in profile. Antenna (Fig. 12) with segment 3 a little longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 a little more than twice as long as broad, 12 a little flattened and curved, tip rounded, about as long as 11, 10 and 11 cylindrical, not swollen beneath, 5-9 with a slight raised line beneath. Mesoscutum and humeri with indistinct small punctures and very short pale hairs, tomentum silvery, not dense. Mesopleuron with rather sparse small punctures, little tomentum. Scutellum with an indistinct central line, closely punctured. Propodeum rather feebly punctate-striate with moderate silvery tomentum and oblique black hairs, posterior depression one-quarter as long as propodeum, impressed line rather well marked, anterior depression deep, quite large. Last segment of fore tarsi elongate. Fore femur with short white pile beneath. Mid femur with white tomentum and some short black hairs beneath. Hind femur with short pile or tomentum beneath and at base some short black hairs. Gastral petiole rather thick, not very long, gradually and not very much widened posteriorly, spiracles not much protruding. Stalk of second gastral tergite about 2.5 times as long as broad. Gaster posteriorly with very close silvery tomentum through which fine bristles protrude.

FEMALE. Not seen.

Holotype ♂, **Uganda**: eastern Mbale district, S. of Mt Elgon, 3700-3900 ft [1130-1190 m], 3-5.viii.1911 (S. A. Neave) (BMNH).

Belonogaster hirsuta sp. n.

MALE. Head ferruginous, whole frons black; mandibles except ventral margin, clypeus except central stripe which is black above and ferruginous below, inner orbits, creamy white. Antennae black, radicle and segments 1-8 beneath creamy, 9-11 ferruginous on both sides, 12 blackish. Mesosoma black except front edge of pronotum and the propodeum around the orifice. Legs black, fore femur ferruginous below, propleuron beneath, small base of fore femur beneath, fore trochanter beneath, anterior streak of mid coxa, trochanter and femur, small basal streak beneath hind femur, creamy white. Gastral petiole and stalk of second gastral tergite ferruginous, rest of gaster blackish. Wings hyaline, margins of veins darkened, costal region on proximal half dark brown, length *ca* 22.0 mm.

Mandibles rather narrow and parallel-sided. Clypeus rounded below, little protruding, weakly convex from side to side, very feebly reticulate, a little shining with scattered large punctures bearing black hairs, no tomentum except a little on frons which is closely and rather coarsely punctured with long outstanding black bristles. Gena about 0.7 of the eye width, rather broader below. Antenna with segment 3 about as long as 4 + 5, segments 4 and 5 about 3 times as long as broad, 8 2.5 times as long as broad, 12 almost straight below, well curved above, a little flattened, tip rounded, as long as 10; segments except 12 all cylindrical, not protuberant beneath. Mesoscutum coarsely closely but shallowly punctured, humeri similar but rather less coarsely punctured, while pleuron more or less strongly and closely punctured; very little tomentum but mesoscutum, humeri, scutellum and metanotum with long black hairs. Scutellum well raised with central impressed line, contiguously punctured. Propodeum behind with oblique striae below and very coarse close shallow punctures above, with a little pale tomentum and close, long black hairs. Last segment of fore tarsus elongate, fore femur with dense pale pile beneath. Mid femur with dense white pile beneath, hind femur with close rather long black hairs beneath. Gastral petiole elongate, gradually a little widened to apex, spiracles little protruding, stalk of second gastral tergite 2.5 times as long as broad. Posterior gaster with dense fine silvery tomentum through which rather fine black bristles protrude.

FEMALE. Not seen.

Holotype ♂, **Tanzania**: Mahali peninsula, Kungwe Camp, 15.ix.1958 (2nd Oxford Expedition) (BMNH).

Belonogaster multipunctata sp. n.

FEMALE. Head ferruginous; small spot at top of clypeus, frons, dorsal boundary of ocular sinus, centre of occiput, antennae except base of segment 3, and whole 1-2 beneath, black. Mesosoma black, front margin of pronotum, metanotum and sides of scutellum, narrow ventral margin of pleuron and propodeum, ferruginous; legs ferruginous, tibiae and tarsi except to some extent hind tibia, black. Gaster black, petiole, base of tergite 2 and some tinge of its posterior part, ferruginous. Wings light brownish, tips hardly darker, venation ferruginous, length 22.0 mm.

Head with clypeus acute below, surface slightly shining with numerous rather large punctures, sparse pale tomentum and scattered black bristles; frons dull with moderately large and close punctures with sparse

pale tomentum and outstanding brown hairs; gena a little wider than eye in profile, dull, especially above, and with rather close medium-sized punctures; base of submentum with some moderately long bristles; antenna with segment 3 longer than 4 + 5, 4 1.5 times as long as broad, 5 rather shorter, 8 a little longer than broad. Mesosoma dull with very close, moderately large punctures, inconspicuous brown tomentum but no outstanding hairs. Scutellum with an impressed line on front half; propodeum with some outstanding hairs below, posterior depression to mid point, impressed line complete, rather strong, anterior depression small, deep. Last segment of fore tarsus elongate; femora beneath with very short white pile. Gastral petiole moderately thick but little widened posteriorly, numerous short hairs on proximal half, spiracles not prominent; stalk of second gastral tergite about 2.5 times as long as broad; gaster posteriorly with rather dense silvery tomentum but no protruding bristles.

MALE. Not seen.

Holotype ♀, **Uganda**: Entebbe, 3800–4000 ft [1160–1220 m], forest within 4 miles [6.5 km] of Kitabi Hill (C. A. Wiggins) (UM, Oxford).

This has some resemblance to *B. hirsuta* of which the ♀ is not known, but that species is blacker with many dark outstanding hairs on the mesosoma and occurs in Tanzania.

Belonogaster vasseae du Buysson

(Fig. 13)

Belonogaster vasseae du Buysson, 1906: 189; du Buysson, 1909: 219, pl. 2, fig. 8. LECTOTYPE ♀, MOZAMBIQUE: 'Basin inférieur du Zambèze, Vallée du Muza', 32°E 18'S, 1000–1120 m, 1905 (G. Vasse) (MNHN, Paris), here designated [examined].

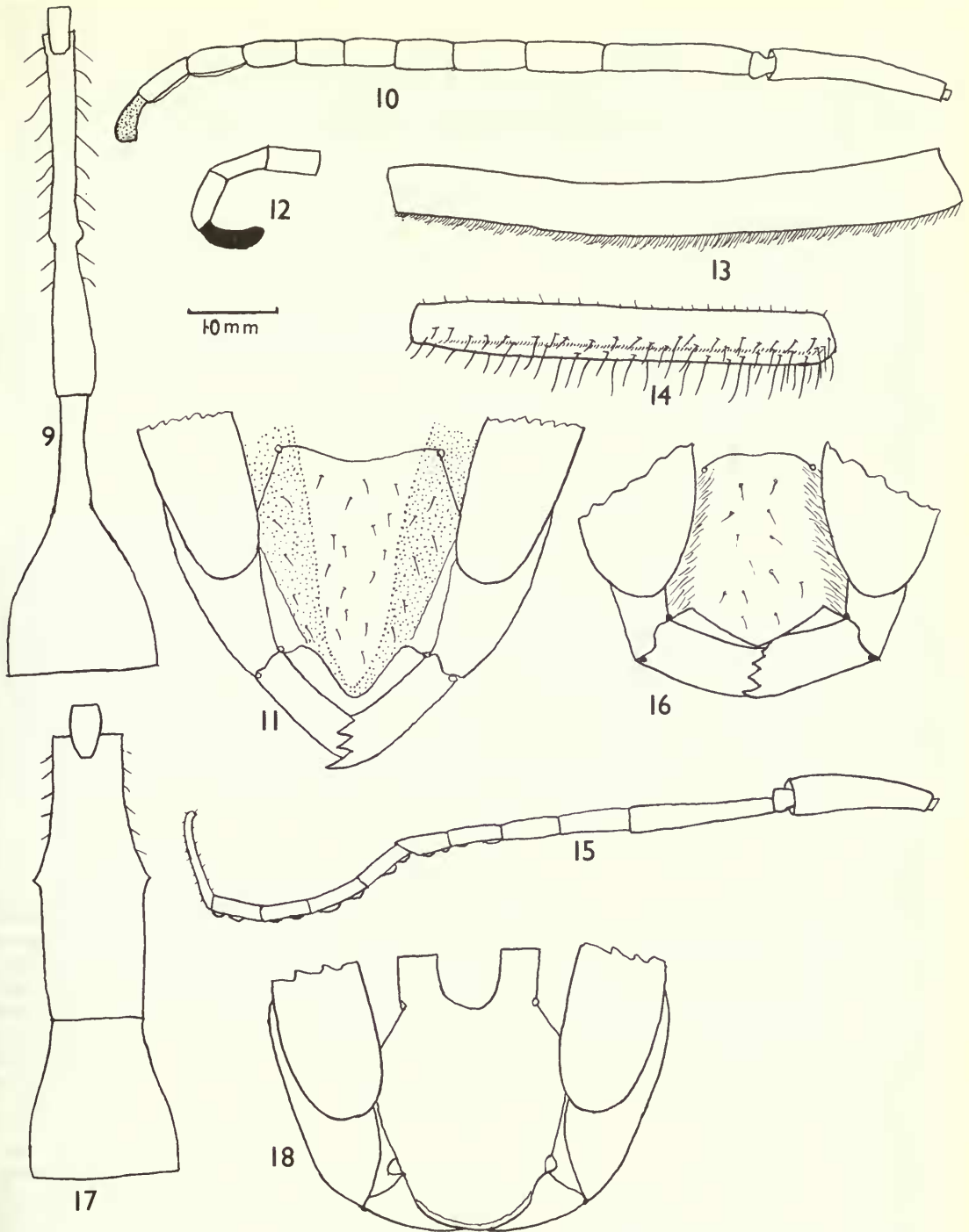
In the MNHN, Paris, 8 ♀ are all labelled type and one of them with the correct locality data is here designated lectotype.

FEMALE. Head ferruginous; frons black, antenna 3–11, 1–2 above, black. Mesosoma dark ferruginous or more often black, mesoscutum black. Legs ferruginous, tibiae and tarsi black, hind tibia ferruginous tinged. Gaster black, petiole ferruginous. Wings black with purple reflections, length 24.0–28.0 mm.

Clypeus acute below, fine reticulate, more shining below, with fairly abundant scattered, moderate-sized punctures, especially above, bearing short black bristles, sparse silvery pubescence, frons with close small punctures bearing short suberect black bristles and close silvery tomentum. Gena about as wide as eye in profile, finely reticulate with quite close small punctures throughout, on upper third bearing suberect short black bristles. Base of submentum and stipes with dense black hairs. Antennal segment 3 longer than 4 + 5, segments 4 and 5 between 1.5 and 1.25 times as long as broad, 8 quadrate. Mesoscutum and humeri with close fine punctures bearing very short black bristles, more obvious on the humeri, rather dense brownish tomentum, mesopleuron similar but punctures a little larger, scutellum and metapleuron like mesopleuron but former with a weak impressed line in front half. Propodeum strongly punctate-striate with very short erect black bristles at sides and sparse brown tomentum, posterior depression about one-third as long as propodeum, impressed line complete, anterior depression rather large, deep. Last segment of fore tarsus long. All femora beneath with a line of dense white pile (Fig. 13) but only some very short bristles. Gastral petiole relatively short and stout, little expanded though somewhat compressed posteriorly, spiracles little projecting, hairs short and rather sparse. Stalk of second gastral tergite about twice as long as broad. Gaster posteriorly with very close pale tomentum with many protruding black bristles.

MALE. Head ferruginous, lateral stripes on clypeus, inner orbits, pale yellow. Frons, vertex and antenna 1–7 above, black, antenna, segments 1–2 yellow beneath, 9–11 ferruginous, 12 blackish. Mesosoma blackish, mesopleuron, scutellum, metanotum and propodeum somewhat ferruginous tinged. Legs dark ferruginous, tarsi black, fore coxae beneath, stripe beneath mid coxae, anterior stripe beneath mid trochanter and base of mid femur, pale yellow. Gaster black, petiole and stalk of second tergite ferruginous. Wings black with purple reflections, length 22–26 mm.

Structure very like the female. Clypeus not much projecting below, tip with a rounded acute angle, finely reticulate with numerous small punctures with erect short black bristles and sparse silvery tomentum. Antennal segment 3 about as long as 4 + 5, segments 4 and 5 between 2.5 and 3.0 times as long as broad, 8 about twice as long as broad, 3–11 with raised lines beneath, 12 much flattened, broadened to truncate apex, dull, about as long as 9. Femora beneath with lines of pale tomentum, less obvious on the hind femur which has some short black bristles beneath.



Figs 9-18 *Belonogaster*. 9, *B. kohli* Schulz, ♀, gastral tergites 1-2. 10, 11, *B. dubia* Kohl, ♂. (10) left antenna; (11) clypeus. 12, *B. ugandae* sp. n., ♂, left antenna, segments 9-12. 13, *B. vasseae* du Buysson, ♀, right hind femur. 14, *B. aurata* sp. n., ♀, right hind femur. 15, 16, *B. nitida*, ♂. (15) left antenna; (16) clypeus. 17, *B. turgida* Kohl, ♀, gastral tergites 1-2. 18, *B. acaulis* sp. n., ♀, clypeus.

The lectotype is one of eight specimens at MNHN, Paris labelled type and it has the data mentioned in the original description.

DISTRIBUTION (60 ♀, 16 ♂). Cameroun (Giordani Soika, 1977: 127), Congo, Zaire, Rwanda (Benoit, 1956: 552), Kenya, Uganda, Tanzania, Zambia, Malawi, Angola, Zimbabwe, Mozambique.

Belonogaster indica (de Saussure)

Raphigaster indicus de Saussure, 1853: 17. Holotype ♀, INDIA ('Les Indes Orientales'): Bombay (MNHN, Paris) [examined].

Belonogaster indicus (de Saussure) F. Smith, 1857: 94; de Saussure, 1891: 87, footnote; Bingham, 1897: 382; du Buysson, 1909: 258.

The only specimen of this species I have seen is the holotype which bears several labels: a red label 'Type'; a black label '*indicus*'; a printed label 'Muséum Paris Judée Roux 1·36'; a written label 'S. Indies, Bombay'; a printed square label '50'; a blue circular label '1:35'. I suppose that the label Judée was added long after the description but I know of no other Indian specimen in European collections, though there are probably some in India which I have not been able to locate. De Saussure's record from Central Africa seems to be an error connected with his *B. indicus* var. *claripennis* (see *B. freyi*, p. 69).

At any rate, *B. indica* seems to be a distinct species and is probably native to southern India.

FEMALE. Clypeus acute below, convex, finely reticulate, dull, with quite numerous large punctures throughout, very little tomentum, scattered pale bristles. Frons dull, with scattered moderate-sized punctures and short outstanding black bristles. Gena about as wide as eye in profile, dull with fairly numerous moderate-sized punctures throughout. Antennal segment 3 as long as 4 + 5 + half 6, 4 and 5 about 1·25 times as long as broad, 8 quadrate. Mesoscutum dull with evenly scattered, fairly close, moderate-sized punctures, and very inconspicuous pale tomentum; humeri rather more finely punctured with sparse fine tomentum, mesopleuron similar. Propodeum with scattered punctures and a few weak striae below, no hairs, very little tomentum, posterior depression two-thirds as long as propodeum, impressed line moderately strong, complete, anterior depression large, shallow. Fifth segment of front tarsi long. Femora almost quite bare beneath, not even with tomentum. Gastral petiole not very long, not very slender, very gradually widened posteriorly, practically bare. Stalk of second gastral tergite 2 as long as broad. Gaster posteriorly almost without tomentum, tergites 3–5 with fine black bristles which are almost hair-like.

MALE. Not seen.

Belonogaster levior sp. n.

FEMALE. Head ferruginous; whole frons and occiput black, antennae black above. Thorax black, front of prothorax, prosternum, some suffusion of mesosternum, ferruginous. Propodeum ferruginous, blackened at sides; scutellum and metanotum reddish round the edges. Legs dark ferruginous, tibiae and tarsi black. Gaster black, petiole and anterior part of tergite 2 ferruginous. Wings dark red-brown, length 14·0–16·0 mm.

Clypeus strongly pointed below, lateral lobes yellow, surface finely reticulate with scattered rather fine punctures with short black bristles. Frons with fairly close fine punctures and very short outstanding black bristles and a little whitish tomentum. Gena about as wide as eye in profile. Antennal segment 3 as long as 4 + 5 + 6, 4 and 5 about as long as broad, 8 a little shorter. Mesoscutum and humeri finely granulate, not punctured, no outstanding hairs, sparse whitish tomentum, mesopleuron scarcely visibly punctured. Scutellum with strong impressed central line, it and metanotum with some fine punctures. Propodeum with posterior face finely reticulate, not punctured or striate, without hairs or tomentum, posterior depression shallow, half as long as propodeum, impressed line to mid point, anterior depression very small, transverse. Last segment of fore tarsus long. Hind femur with only some pale tomentum beneath. Gastral petiole relatively short and thick, apex a little widened, spiracles little prominent. Stalk of second gastral tergite 1·5 times as long as broad. Gaster posteriorly with moderately dense brown tomentum, through which some short blackish bristles protrude.

MALE. Head light ferruginous, dorsal stripe on mandible, broad sides of clypeus, inner orbits to bottom of sinus, spot between antennal sockets, antennae beneath, white. Vertex broadly, trident mark on frons, antennal segments 1–10 above, black. Mesosoma light ferruginous, mesoscutum with three broad black stripes. Legs dark ferruginous, tarsi and hind tibiae more black, fore femur beneath, anterior stripes on mid

femur, mid and hind tibiae, white; small white spots at base and apex of hind femur; large area on fore coxa and trochanter, mid coxa and trochanter, white. Gaster with petiole and segment 2 ferruginous, 3–6 black. Wings very pale brownish, length 14·0 mm.

Clypeus acutely produced beneath, surface little convex with scattered short black outstanding bristles, no tomentum. Frons with little greyish tomentum, no hairs or bristles. Gena about 0·7 of eye-width in profile. Antennal segment 3 distinctly longer than 4 + 5, 4 and 5 well over twice as long as broad, 8 twice as long as broad, 12 a little flattened and curved, end rounded, about as long as 10, 10 and 11 strongly convex beneath, other segments with raised lines beneath. Mesosoma as in ♀. Fifth segment of fore tarsus a little shortened. Femora with slight tomentum but no hairs beneath. Gaster as in ♀, apart from the flattened seventh sternite.

Holotype ♀, **Uganda**: Budongo Forest, Unyoro, 3400 ft [1040 m], 11–15.xii.1911 (*S. A. Neave*) (BMNH).

Paratypes. **Congo**: 1 ♀, Dimonika, 18.v.1977 (*Grillot & Morin*) (MNHN, Paris) (thorax and fore tibia largely ferruginous, wings blackish with slight violet reflections); 1 ♀, Makaba, 23.i.1977, path through abandoned plots (*S. Kelner-Pillault*) (MNHN, Paris) (pleuron and propodeum largely black). **Liberia**: 1 ♂, Bendija (*W. M. Mann*) (USNM, Washington).

The propodeum resembles those of *B. aurata* and *B. atrata* but the other characters are clearly different.

Belonogaster atrata von Schulthess

Belonogaster atrata von Schulthess, 1912: 41; 1913: 337, fig. 1. LECTOTYPE ♀, CAMEROUN: Uelleborg (EI, Zurich), here designated [examined].

This species was described from 5 ♀, Cameroun: Uelleborg, vi.–viii.1908 (*Tessman* coll.). Only one female seems now to be available at the EI, Zurich, and I designate this as the lectotype.

FEMALE. Head black, malar space, clypeus, inner orbits to bottom of ocular sinus, mandibles, ferruginous. Lateral lobes of clypeus yellowish. Antennae somewhat reddened beneath. Mesosoma and legs black, area of propodeum round orifice ferruginous. Gaster black, petiole and stalk of second segment ferruginous. Wings blackish, length 14·0 mm.

Clypeus acute below, finely reticulate more strongly so above, with rather numerous and large punctures, short oblique black bristles, very little pale tomentum. Frons dull, closely reticulate with close rather coarse punctures and long outstanding black hairs, as also on vertex. Gena about 0·7 of eye-width in profile, dull, feebly reticulate and fairly closely punctured with appressed brownish hairs. Antenna with segment 3 nearly as long as 4 + 5 + 6, 4 1·5 times as, 5 as long as broad, 8 slightly shorter. Mesoscutum and humeri with close, large, shallow punctures, larger and shallower and less well-defined on mesoscutum, with rather close, outstanding black hairs, no tomentum. Scutellum like mesoscutum, with no central line. Metanotum reticulate like propodeum but with quite distinct punctures. Mesopleuron closely granulate with numerous rather small punctures especially posteriorly. Propodeum with very close, fine reticulation without punctures, striae, or tomentum or hairs except at the extreme sides; posterior depression one-quarter length of propodeum, impressed line distinct, complete, anterior depression small, transverse. Fore tarsus with fifth segment short. Mid and hind femora with distinct pale tomentum and moderately numerous greyish hairs beneath. Gastral petiole rather short and thick, distinctly widened from the little projecting spiracles, with numerous long outstanding hairs. Stalk of second gastral tergite 1·5 times as long as broad. Gaster posteriorly with appressed not close brownish tomentum and subappressed black bristles.

MALE. Not seen.

Belonogaster aurata sp. n.

(Fig. 14)

FEMALE. Head ferruginous, frons and vertex black, antennae darkened above, clypeus slightly yellowish tinged. Mesosoma light ferruginous, humeri, mesoscutum and pleura in part, darkened. Legs ferruginous, mid and hind femora and tibiae darkened, tarsi black. Gastral petiole and stalk and base of second segment, ferruginous, rest of gaster black. Wings dark red-brown, tips a little darker, length 17·5 mm.

Clypeus acute below with tomentum on the upper three-quarters, with scattered rather fine punctures and fine black bristles. Frons rather strongly punctured, reticulate, dull with silvery tomentum and outstanding black hairs. Mesoscutum and humeri dull, reticulate with close coarse punctures and dense brassy tomen-

tum and long outstanding black hairs. Pleura with sparse finer punctures and sparse tomentum; scutellum and metanotum with sparse coarse punctures and outstanding black hairs; propodeum with sides not very coarsely punctured, posterior surface smooth, finely reticulate, not punctured or striate with outstanding black hairs only on valves and sides; posterior depression one-quarter as long as propodeum, impressed line complete, anterior depression shallow, transverse. Fifth segment of fore tarsus elongate. Mid and hind femora (Fig. 14) with quite long black hairs beneath and anteriorly, hind femur also with a line of white pile beneath. Gastral petiole relatively long and slender but distinctly widened distally, with long black hairs above and below, spiracles not prominent, stalk of second gastral tergite 3 times as long as broad, rest of gaster with dense brassy tomentum with fine black bristles protruding from it.

MALE. Not seen.

Holotype ♀, **Nigeria**: Lagos (*W. A. Lamborn*) (BMNH).

This and the two previous species agree in the unusual form of the propodeum but differ from one another in many other characters.

Belonogaster nitida sp. n.

(Figs 15, 16)

MALE. Reddish ochreous with mandibles, whole face, front of pronotum, front of scutellum, metanotum, two large square spots on propodeum, fore tibiae, irregular band widened at sides on gastral tergite 2, ochreous yellow. Wings hyaline, venation ochreous, length 12·0 mm.

Whole body, including propodeum, smooth and shining. Frons, mesoscutum, scutellum and metanotum with long outstanding black hairs. Clypeus (Fig. 16) very obtusely angled below, with sparse black hairs on disk, long dense outstanding silvery hairs at sides. Eyes somewhat swollen below with a few scattered hairs. Gena about one-third as wide as eye in profile. Antenna (Fig. 15) with segment 3 longer than 1 + 2, a little longer than 4 + 5, segments 4 and 5 between 4 and 5 times as long as broad, 8 more than 2·5 times as long as broad, 12 cylindrical, a little curved, end rounded, about 5 times as long as broad, 9–11 cylindrical, 10 and 11 each with two connected prominences beneath, 6–8 with two shining prominences beneath, 8–12 thinner than 1–7. Mesoscutum with relatively close large punctures, pleuron very finely granulate, scutellum and metanotum punctured like mesoscutum but rather less coarsely. Propodeum not sculptured, posterior depression long and narrow, three-fifths length of propodeum, no impressed line, anterior depression large, transverse. Last segment of fore tarsus elongate. Femora tomentose but without hairs or bristles beneath. Petiole long and slender, distal two-fifths clearly thicker, spiracles not prominent, stalk of second gastral tergite 4 times as long as broad, gaster posteriorly feebly tomentose.

FEMALE. Not seen.

Holotype ♂, **Nigeria**: Eastern province, Oguta, east of Onitsha, 1.vii.1950 (*J. L. Gregory*) (BMNH).

This species is so different from all the others that it is almost like a member of another genus. It would be interesting to see the female.

Belonogaster turgida Kohl

(Fig. 17)

Belonogaster turgidus Kohl, 1894: 322, 333, pl. 15, fig. 74, pl. 16, fig. 114. Holotype ♀, FERNANDO PO (NM, Vienna) [examined].

FEMALE. Head light ferruginous, large area round the ocelli moderately darkened, antennal segments 3–11 darkened above, 10–11 rather less so. Mesosoma light ferruginous, most of gastral tergites 2–5 darkened, tergite 2 with two large but well separated transverse spots, tergites 3–4 with transverse subapical spots, creamy white. Wings light fuscous, costal region and venation red-brown, length 19·0 mm.

Clypeus below obtusely angular but distinctly pointed, surface mostly dull and tomentose but ventral third more shining with large punctures. Frons dull with rather close moderate-sized punctures with silvery not very dense tomentum and very short, pale outstanding bristles. Gena nearly as wide as eye, mostly dull, no black hairs, moderately numerous punctures on lower quarter. Antenna with segment 3 distinctly longer than 4 + 5 which are about 1·25 times as long as broad, 8 quadrate. Humeri and mesoscutum with quite numerous but inconspicuous small punctures, tomentum very short, rather close silvery tomentum. Meso-

pleuron similar, but punctures stronger. Scutellum and metanotum quite closely punctured, former with an impressed line. Propodeum roundly convex with rather coarse close punctures, close whitish tomentum and a few outstanding hairs, posterior depression very deep and large, three-fifths as long as propodeum, impressed line moderately strong, anterior depression large and deep. Legs rather short and stout, last segment of fore tarsus elongate, tibiae and tarsi less bristly than usual, hind femora with only tomentum beneath. Gaster with petiole (Fig. 19) short and broad, about 4 times as long as broad at apex, very little widened posteriorly where about as wide as length of mid basitarsus, stalk (Fig. 17) of second gastral tergite about 4 times as wide as long, hardly developed; posterior tergites with dense silvery tomentum and no protruding bristles.

MALE. Not seen.

This is another very distinct species with the gastral petiole much wider than usual.

Belonogaster acaulis sp. n.

(Fig. 18)

FEMALE. Head ferruginous; large rounded-rectangular spot on the frons (including the ocelli) blackish; ventral margin of clypeus pithy. Mesosoma black, extreme front margin of pronotum, scutellum, metanotum, whole sternal region, wing-bases, posterior part, including the depression of propodeum, ferruginous; legs ferruginous. Gaster with segments 1-2 and 5-6 ferruginous, 3-4 black; basal dot on stalk of gastral tergite 2 and some narrow suffusion of its apex, black, two large subapical irregularly comma-shaped pale yellow spots. Wings light ferruginous, tips moderately darkened, length 18.0 mm.

Clypeus (Fig. 20) below produced into a broad curved lobe, margin widely pithy and slightly raised, lateral lobes prominent, reticulate but lower half more shining with a number of large punctures bearing short black bristles. Frons finely reticulate with not very close small punctures and a few outstanding short black bristles. Gena shining and finely punctured below, dull and reticulate above, a little wider than eye in profile. Antennal segment 3 almost as long as 4 + 5 which are each about as long as broad, 8 just transverse. Mesoscutum finely but quite strongly reticulate with some small inconspicuous punctures round the margins, tomentum very short and inconspicuous greyish, no outstanding hairs; humeri and mesopleuron like the mesoscutum but punctures a little more distinct; scutellum with a deep central furrow and rather weak punctures. Propodeum reticulate with rather stronger and larger punctures, traces of striae on lower part of the angles, posterior depression half as long as the propodeum, impressed line distinct, anterior depression transverse, rather shallow, surface with feeble tomentum and quite numerous but very short outstanding black hairs. Last segment of fore tarsi elongate. Hind femur beneath with tomentum a few short pale bristles. Gastral petiole (Fig. 18) short and thicker than usual with the basal part a little wider than the distal part, spiracles not at all projecting, no hairs; stalk of gastral tergite 2 not longer than broad; gaster posteriorly with short, inconspicuous tomentum.

MALE. Not seen.

Holotype ♀, **South Africa**: Natal National Park, iii.1962 (*J. Ogilvie*) (BMNH).

This is another peculiar species with a clypeus quite unlike any other species and an unusual gastral petiole.

Belonogaster saeva de Saussure

(Figs 19, 20)

Belonogaster saevus de Saussure, 1891: 91, footnote. Syntype(s) ♀, 'TROPICAL AFRICA' (depository unknown).

FEMALE. Head ferruginous, frons, vertex and antennal segments 1-3 above, black, 4-11 more or less darkened. Mesosoma ferruginous, mesoscutum, humeri, mesopleuron more or less darkened. Legs ferruginous, tibiae and tarsi black. Gaster black, petiole and much of segment 2, ferruginous. Wings usually blackish brown, sometimes paler, length 20.0-27.0 mm.

Clypeus acute below, finely reticulate, more shining below, with many moderate-sized punctures bearing short erect black bristles, also sparse pale tomentum. Frons with many small punctures with erect black bristles and not very dense pale tomentum. Base of submentum and stipes with dense long black bristles. Gena about as wide as eye in profile. Antennal segment 3 much longer than 4 + 5, 4 and 5 each about twice as long as broad, 8 a little longer than broad. Mesoscutum and humeri closely granulate with very close fine

punctures and long erect black hairs and moderate close greyish tomentum. Mesopleuron similar, metanotum and scutellum similar but with coarser punctures, latter with an impressed line on anterior half. Propodeum closely punctate-striate with long dark hairs and not very close pale tomentum, posterior depression half as long as propodeum, impressed line complete, anterior depression small, deep. Fifth segment of fore tarsus elongate. Femora beneath with a line of outstanding white pile beneath, hind pair also with numerous long blackish hairs, especially on basal half. Gastral petiole long but rather stout, very gradually but distinctly widened posteriorly, spiracles not projecting, many rather long hairs, especially proximally; stalk of second tergite 2-3, usually 2.5 times as long as broad; gaster posteriorly with fairly close silvery tomentum and sometimes some black hairs but not bristles.

MALE. Head ferruginous; frons vertex centrally, antennal segments 1-8 above, black; dorsal half of mandibles, scape beneath, clypeus except narrow ventral margin and a round black spot below antennal sockets and narrow central ferruginous stripe, inner orbits to centre of ocular sinus, yellow. Mesosoma black, narrow anterior part of pronotum, scutellum and metanotum, sclerites round wing-bases, area round propodeal valves, mesosternum, ferruginous. Legs ferruginous, inner side of fore coxa and trochanter, ventral stripe on mid coxa and trochanter, small basal femoral area, yellow. Gaster black; petiole, much of second tergite proximally ferruginous. Wings more or less blackish, length 21.5-26.0 mm.

Structurally very like the ♀. Mandibles parallel-sided, not widened. Clypeus (Fig. 20) obtusangular below, actual tip rounded, with numerous black bristles and practically no silvery tomentum. Antenna (Fig. 19) with segment 3 as long as 4 + 5, 4 and 5 2.5 times as long as broad or rather longer, 8 about twice as long as broad, 12 slightly flattened, straight beneath, dorsal edge moderately curved, tip rounded, about as long as 11, 10 and 11 almost cylindrical, scarcely projecting beneath, 3-11 with a slightly raised rather shining line beneath. Gena rather wider than half the eye-width in profile.

DISTRIBUTION (55 ♀ 15 ♂). **Sierra Leone, Ghana, Cameroun** (Giordani Soika, 1977: 127), **Congo, Zaire, Kenya, Uganda, Malawi, Tanzania, South Africa** (Cape of Good Hope).

Belonogaster pileata sp. n.

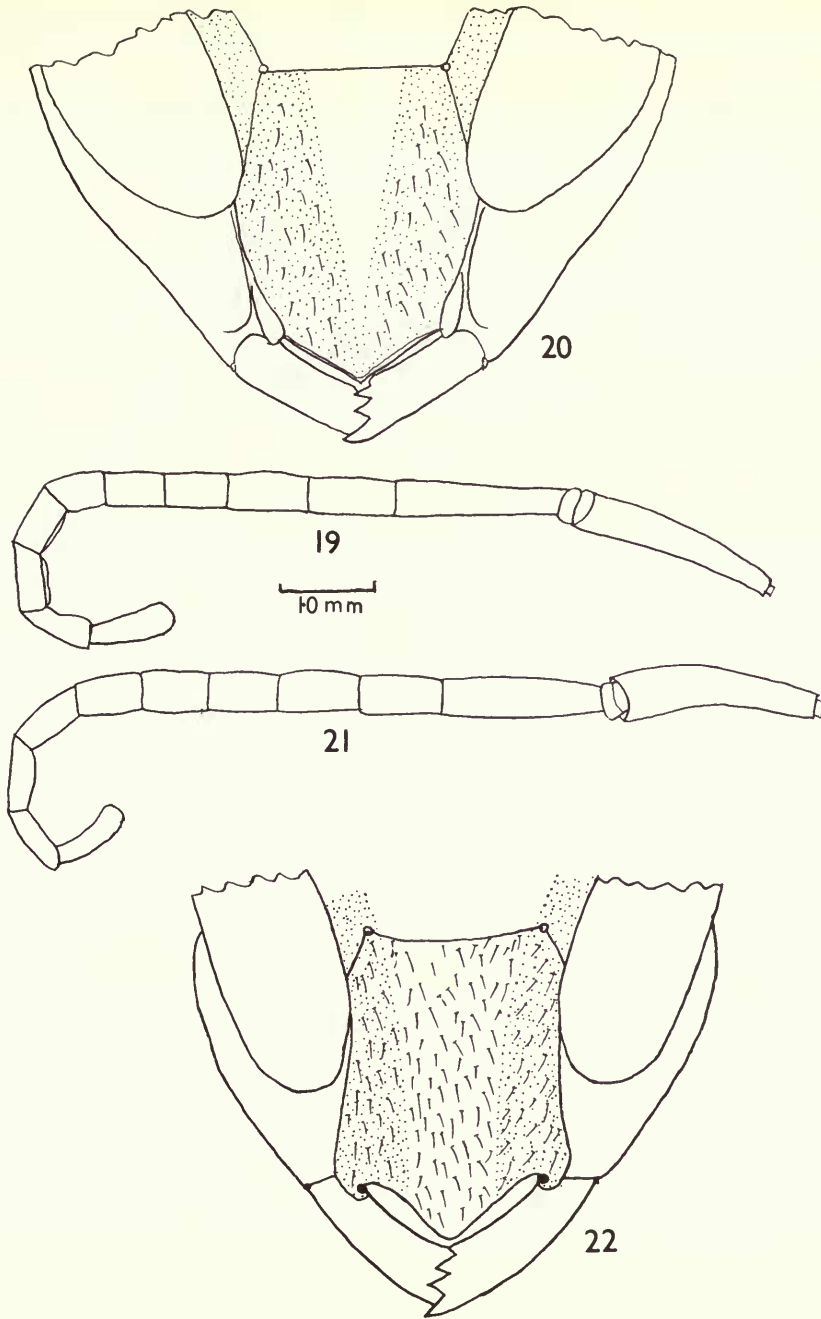
(Figs 21, 22)

FEMALE. Black. Head ferruginous except ocellarium and antennae. Gastral petiole and stalk of tergite 2, dark ferruginous. Wings dark fuscous with faint purplish reflections, length 24.0 mm.

Clypeus acutely angled below, feebly and very finely reticulate with scattered large punctures bearing short black bristles, fine brownish tomentum. Frons dull, reticulate with small shallow punctures and short outstanding black bristles. Gena about 1.5 times as wide as eye in profile, raised margin hardly reaching down to mid-point of eye. Antennal segment 3 nearly as long as 4 + 5 + 6, 4 and 5 about 1.25 times as long as broad, 8 just longer than broad. Bases of submentum and stipes with a few long dark hairs. Mesoscutum and humeri with close small shallow punctures bearing short black bristles, tomentum brown, inconspicuous, mesopleuron with sparser, considerably larger punctures; scutellum moderately convex, densely punctured with a strong central line; metanotum closely punctured with a smooth depression at centre of front margin. Propodeum punctured at sides, dorsally obliquely punctate-striate, no hairs, tomentum very inconspicuous; posterior depression rather more than half as long as propodeum, impressed line strong, anterior depression deep but narrow. Fifth segment of fore tarsus elongate. Fore and mid femora with very dense outstanding pale pile, hind femur bare beneath except for inconspicuous tomentum. Gastral petiole long but wide, clearly widening posteriorly, spiracles little projecting; stalk of second tergite 1.5-2.25 times as long as broad; gaster posterior with no black bristles amongst the short brownish tomentum.

MALE. Dark ferruginous, much blackened, especially antennae above and on segments 3-5 below, mesoscutum, lower mesopleuron, tarsi, gastral segments 3-6. Sides of clypeus, inner orbits, whitish yellow. Wings blackish brown, length 22.0 mm.

Clypeus (Fig. 22) feebly produced below, tip almost rounded, clypeus almost shining with scattered moderate-sized punctures and short black bristles, tomentum inconspicuous. Frons dull, feebly punctured with short outstanding black hairs. Gena two-thirds as wide as eye in profile. Antennal segment 3 about as long as 4 + 5, 4 and 5 each about 2.5 times as long as broad, 8 rather less than twice as long as broad, 9-12 pale ferruginous, 12 as long as 11, slightly widened to apex, moderately flattened, a little curved, especially dorsally, 10-11 cylindrical, but 10 with a slight elongate prominence beneath, 5-8 with weak raised lines beneath. Mesoscutum, humeri and mesopleuron scarcely punctured; very short outstanding hairs on mesoscutum, tomentum inconspicuous, as on pleuron; scutellum and metanotum more punctured; propodeum feebly punctured, with feeble tomentum and no hairs, posterior depression one-third as long as propodeum, impressed line weak, anterior depression transverse. Segment 5 on fore tarsus elongate. Hind femur with



Figs 19–22 *Belonogaster*. 19, 20, *B. saeva* de Saussure, ♂. (19) left antenna, (20) clypeus, 21, 22, *B. pileata* sp. n., ♂. (21) left antenna; (22) clypeus.

only feeble tomentum beneath. Gastral petiole long, widened to apex, spiracles little projecting; stalk of second gastral tergite hardly twice as long as broad. Gaster with rather close silvery tomentum but no bristles.

Holotype ♀, **Kenya**: Tareta forest (near Tanzanian border), viii.1947 (*V. G. L. van Someren*) (BMNH).

Paratypes. **Kenya**: 1 ♀, Malindi, 20.ix.1948 (*V. G. L. van Someren*); 1 ♀, Nairobi, 20.i.1956 (*F. J. Jackson*) (BMNH); 1 ♂, Voi, x.1909 (*C. I. Alluaud*) (MNHN, Paris). **Tanzania**: 1 ♀, Tanga iv.1912 (*Alluaud & Jeannel*) (MNHN, Paris). **Malawi**: 2 ♀, Mulanga Mountain, 17.x.1971 (*C. G. M. Schulten*); 1 ♀, Tuchila, 4.v.1971 (*C. G. M. Schulten*) (ITZ, Amsterdam).

Apparently a variety of this species. Gastral tergite 2 with two transverse, moderate-sized yellow spots. Wings browner. Stalk of second gastral tergite 2.5 times as long as broad. **Uganda**: 1 ♀, about 2 miles [3 km] ENE. of Entebbe, 3100 ft [945 m], forest shore of lake, 7.ii.1912 (*C. A. Wiggins*) (BMNH).

Belonogaster brunnea Ritsema

(Figs 25–27)

Belonogaster brunneus Ritsema, 1874: 202, pl. 11, fig. 1.

Ritsema described this species without giving any locality in a paper dealing mainly with New Guinea material but including a few African species. The holotype is labelled 'Piget & Woerdon, Congo'. Colour described under the two subspecies.

FEMALE. Clypeus acute below, dull, more shining below with some large punctures, above finely granulate, tomentum very sparse, black bristles few and scattered. Frons dull with indistinct punctures and dense short outstanding black hairs and sparse reddish tomentum. Gena as wide as eye in profile (Fig. 27). Antenna with segment 3 nearly as long as 4 + 5 + 6, 4 and 5 a little longer than broad, 8 just longer than broad. Mesoscutum not punctured, rather strongly granulate with very short brownish tomentum and outstanding black hairs; scutellum and metanotum distinctly punctured; mesopleuron dull, granulate with very weak fine punctures. Propodeum very closely punctate-striate or granulate with moderately dense outstanding fine black hairs; posterior depression half as long as propodeum, impressed line strong to rather above mid point, anterior depression large. Last segment of fore tarsi elongate. Mid and hind femur with numerous oblique black hairs and bristles, especially on proximal third, also fine silvery tomentum. Gastral petiole long, relatively narrow, a little widened on posterior half, with close silvery tomentum and short hairs, spiracles little projecting. Stalk of second gastral tergite about twice as long as broad, gaster posteriorly with dense silvery tomentum and sometimes some pale or black protruding bristles.

MALE. Mandibles approximately parallel-sided. Clypeus (Fig. 24) below little produced, ventral margin very obtuse, tip just rounded, disk a little flattened, ventral third with a number of large punctures, dorsal part finely granulate with sparse tomentum which is a little longer and more silvery at sides but not conspicuous. Frons dull, finely granulate, scarcely punctured, with rather sparse pale tomentum and scattered short dark hairs. Gena about two-thirds as wide as eye in profile. Antenna (Figs 23, 26) with segment 3 just longer than 4 + 5, 4 and 5 rather less than 2.5 times as long as broad, 8 rather more than 1.5 times as long as broad, segment 12 normally shining black but sometimes partly ferruginous, very little flattened, gently curved, tip rounded, 9–11 reddish yellow, 11 cylindrical, as long as 12, 9–10 considerably thicker than 11, distal half of 3–10 with raised shining lines beneath. Mesosoma as in ♀. Last segment of fore tarsi elongate. Hind tibia and femur (Fig. 25) with black bristles or hairs beneath. Gaster as in ♀ but petiole rather thicker. There are two subspecies.

Belonogaster brunnea brunnea Ritsema

(Figs 23–25)

Belonogaster brunneus Ritsema, 1874: 202, pl. 11, fig. 1. Holotype ♀, CONGO (RNH, Leiden) [examined].

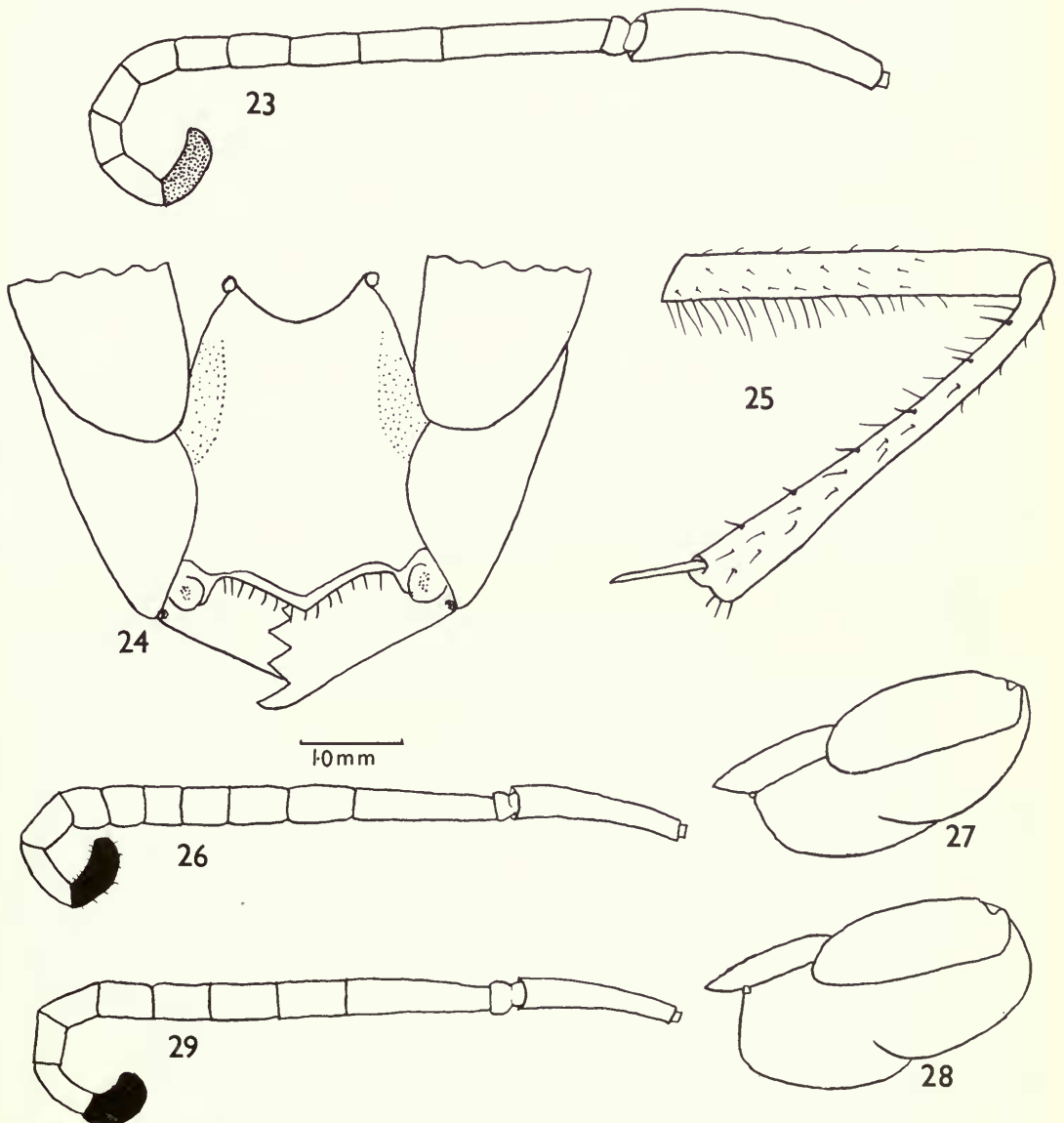
Belonogaster distinguendus Kohl, 1894: 322, 323, 328, pl. 15, figs 79–81. LECTOTYPE ♂, WEST AFRICA: 'Chutes de Sambla, Riv. N. Gamio' [untraced] (*Moquersys*) (NM, Vienna), here designated [examined].
Syn. n.

FEMALE. Head ferruginous, frons black, antennal segments 3–7 darkened above. Mesosoma ferruginous, mesoscutum, humeri, mesopleuron posteriorly, propodeum dorsally, a little darkened. Legs ferruginous,

tibiae a little darkened, tarsi black but last segment more ferruginous. Gaster black, segments 1–2 ferruginous, more or less darkened posteriorly. Wings evenly light fuscous, venation red-brown, length 14.5–18.0 mm.

MALE. Like ♀ but clypeus and orbits yellow at sides, top half usually also yellow-marked. Mesosoma and legs little darkened. Wings more or less dark red-brown, length 15.5–18.0 mm.

DISTRIBUTION (25 ♀, 24 ♂). **Liberia, Ghana, Sierra Leone, Nigeria, Fernando Po, Gabon, Congo, Rwanda,** (Benoit, 1956: 552). Also the type-locality of *B. distinguendus* Kohl.



Figs 23–29 *Belonogaster*. 23–25, *B. brunnea brunnea* Ritsema, ♂. (23) left antenna; (24) clypeus; (25) left hind femur and tibia. 26, 27, *B. brunnea nigriclava* subsp. n. (26) ♂, left antenna; (27) ♀, left gena. 28, 29, *B. clypeata clypeata* Kohl. (28) ♀, left gena; (29) ♂, left antenna.

Belonogaster brunnea nigriclava subsp. n.

(Figs 26, 27)

MALE, FEMALE. Similar to subsp. *brunnea* but wings darker with the tips dark. Thorax often darker. Femora largely black.

Holotype ♂, **Uganda**: Mt Kokanjero, SW. Mt Elgon, 6400 ft [1950 m], 7–9.viii.1911 (S. A. Neave) (BMNH).

Paratypes. **Uganda**: 1 ♀, East Butiaba, L. Albert, 3200 ft [970 m], 9–10.xii.1911 (S. A. Neave) (BMNH); 1 ♂, Mabira Forest, Chagwe 3500–3800 ft [1060–1160 m], 16–25.vii.1911 (S. A. Neave); 2 ♀, between Kafu R. and Kigoma, 3600–3800 ft [1100–1160 m], 1–3.i.1912 (S. A. Neave); 1 ♂, 1 ♀, north of Lake Isolt, 3700 ft [1130 m], 4–6.i.1912 (S. A. Neave); 1 ♂, between Jinja and Bwia, E. Busoga, 3800–4000 ft [1060–1220 m], 1.viii.1911 (S. A. Neave); 1 ♂, near Kampala, 4000 ft [1220 m], 12–13.viii.1911 (S. A. Neave); 1 ♀, Eastern Mbale district, S. of Mt Elgon, 3700–3900 ft [1130–1190 m], 2–5.viii.1911 (S. A. Neave); 1 ♀, Entebbe, ii.1912 (C. A. Wiggins); 1 ♀, Entebbe, xi.1912 (C. C. Gowdey) (BMNH); 1 ♂, eastern Toro province, 1909 (C. Alluaud) (MNHN, Paris); 1 ♀, Entebbe, 3800–4000 ft [1160–1220 m], 26.v.1912 (C. A. Wiggins) (UM, Oxford); 1 ♀, 4 miles [6.5 km] from Kitabi Hill, viii.–ix.1913 (C. A. Wiggins); 1 ♂, NNE. of Kitabi Hill, 29.vi.1912 (C. A. Wiggins) (UM, Oxford). **Kenya**: 1 ♀, Mtito Andei, 2500 ft [760 m], 26–8.iii.1911 (S. A. Neave) (BMNH); 2 ♂, Nandi Plateau, 5700–6200 ft [1740–1890 m], 20.v.–4.vi.1911 (S. A. Neave); 1 ♂, 1 ♀, Kibwezi, ii. and xii.1929 (van Someren); 7 ♂, 10 ♀, Ngare Norok, Masai reserve, 6000 ft [1830 m] (A. D. Luckman); 7 ♂, 5 ♀, Mgorr River, v.1913 (A. D. Luckman) (BMNH); 1 ♀, Namanga, 13.ii.1958 (P. Strinati & V. Aellen) (MHN, Genoa), 1 ♂, Embu, Mjakini forest, 1400 m, 6.x.1974 (R. de Jong) (RNH, Leiden); 1 ♀, Nairobi, Kabete, 15.ii.1978 (C. G. M. Schulten) (ITZ, Amsterdam). **Zambia**: 2 ♀, N. shore of Lake Bangweolo, 3800 ft [1160 m], 27.v.1908 (S. A. Neave), 2 ♂, 17.vi.1908 (S. A. Neave), 2 ♀, 13.vi.1908, 1 ♀, 12.vii.1908; 1 ♂, Lake Bangweolo, Luwingu, 4200 ft [1280 m], 4.vi.1908 (S. A. Neave); 1 ♀, E. shore of Lake Bangweolo, 3800 ft [1160 m], 22.v.1908 (S. A. Neave); 1 ♀, Upper Luangwa Valley, 1800–2000 ft [550–610 m], 30.iii.1908 (Neave), 3 ♀, Lower Chambezi Valley, Kasuma district, 3900 ft [1190 m], 30.iv.–i.v.1908 (Neave); 2 ♀, Mid-Chambezi Valley, Chinsali distr., 4000 ft [1220 m], 24–5.iv.1908 (Neave); 1 ♀, Alota Plateau, Ndobi district, 4000 ft [1220 m], 12.x.1905 (Neave); 2 ♂, Upper Kalungwizi Valley, 4200 ft [1280 m], 24.vii., 11.ix.1908 (Neave) (BMNH). **Malawi**: 2 ♀, Salima, 17.iii.1970 (C. G. M. Schulten); 1 ♀, Limbe, 9.ii.1968 (C. G. Schulten); 2 ♀, Mzuzu, 3.v.1972 (C. G. Schulten); 1 ♀, Karonga, 15.ii.1971 (C. G. M. Schulten) (ITZ, Amsterdam). **Tanzania**: 1 ♂, 1 ♀, S. of Lake Tanganyika, 4500 ft [1370 m], 18–21.viii.1908 (Neave) (BMNH); 1 ♀, Maranga, 1.vii.1978 (C. G. M. Schulten) (ITZ, Amsterdam). **Zaire**: 1 ♀, 150–200 miles [240–320 km] N. of Kambove, 3500–4000 ft [1070–1220 m], 28.ix.1907 (S. A. Neave) (BMNH).

Belonogaster clypeata Kohl

(Figs 28–31)

Belonogaster clypeatus Kohl, 1894: 321, 328, pl. 15, figs 88, 91.

Kohl described the species from '♂ ♀ Deutsch Mozambique (Dr Fischer leg. 1892), Madagascar'. I do not believe that the species occurs in Madagascar but a male from Mozambique, received from Dr Fischer, is in the collection of the NM, Vienna and is here designated lectotype.

FEMALE. Colour described under the subspecies. Clypeus acute below, finely granulate above, on lower quarter finely reticulate with large punctures and a few brown bristles and rather sparse silvery pubescence. Frons finely granulate with short small bristles in front and rather close silvery tomentum. Gena (Fig. 28) nearly twice as wide as eye in profile, finely reticulate with scattered fine punctures below. Antennal segment 3 clearly longer than 4 + 5, 4 and 5 only just longer than broad, 8 quadrate. Base of stipes and submentum with quite numerous black bristles. Mesoscutum and humeri granulate, scarcely punctured with dense silvery tomentum; mesopleuron similar but with close moderately large punctures; scutellum with weak punctures and an impressed line on front half; metanotum with considerably closer punctures. Propodeum granulate, punctate-striate above with close silvery tomentum and numerous bristles, posterior depression rather less than half as long as propodeum, impressed line strong for two-thirds the length of propodeum, anterior depression large and deep. Last segment of fore tarsus elongate. Hind femur with sparse tomentum and sparse short bristles. Gastral petiole long, moderately wide, spiracles not much projecting, posterior part moderately widened, hairs short and very numerous; stalk of second gastral tergite 1.5–2.0 times as long as broad. Gaster posteriorly with moderately dense pale tomentum, usually no bristles but some often present in the north-western subspecies.

MALE. Mandibles with a strong hump just beyond base, widened towards apex. Clypeus (Fig. 30) with lateral lobes large, clypeus slightly emarginate and depressed between them, the central lobe being a small rounded process not protruding beyond the lateral lobes; upper part of clypeus flattened, granulate with very little tomentum. Frons finely granulate, a band of small punctures in front, projecting bristles very short, silvery tomentum moderately close, vertex unusually wide behind eyes. Gena about twice as wide as eye-width in profile, slightly shining, very finely reticulate, not punctured. Base of submentum and stipes with a few long bristles. Antenna (Fig. 29) with segment 3 much longer than 4 + 5, 4 and 5 about 2.25 times as long as broad, 8 about 1.5 times as long as broad, 12 very wide and flattened, spoon-shaped, blackened on concave side, convex side with fine hairs, 10–11 pale yellow, cylindrical, both at least twice as long as broad, 9 considerably thicker than 10 or 11, 6–8 with a weak raised line beneath. Mesosoma much as in female. Fore tarsus with last segment elongate. Mid and especially hind femur (Fig. 31) and trochanter with close white pile and long black hairs beneath; hind tibia with not very close long pale hairs beneath. Gastral petiole long, considerably widened to apex, spiracles moderately projecting, hairs short, not conspicuous. Stalk of second gastral tergite about 1.5 times as long as broad; gaster posteriorly with not very close pale tomentum and projecting bristles only in the north-western subspecies.

There are two subspecies which to some extent overlap in distribution and intergrade in colour.

Belonogaster clypeata clypeata Kohl

Belonogaster clypeatus Kohl, 1894: 321, 328, pl. 15, figs 88, 91. LECTOTYPE ♂, MOZAMBIQUE (NM, Vienna), here designated [examined].

FEMALE. Ferruginous, mandibles, malar space and clypeus a little yellow tinged. Mesopleuron and sternum somewhat darkened. Gaster a little darkened posteriorly, tergite with large yellow comma-shaped spots on posterior margin, narrowly separated. In dark specimens, the mesosoma, coxae, base of femora or even the whole of mid and hind femora, apex of gastral tergite 2, and whole of 3–4, more or less darkened; yellow spots of tergite 2 whitish. Propodeal hairs pale. Wings light brown, tips somewhat darkened, length 17.0–18.0 mm.

MALE. Colour much as in female, knees, especially the mid pair and sides of clypeus, with a little yellow. Hairs of femora and tibiae mostly white.

DISTRIBUTION (42 ♀, 9 ♂). **South Africa** (Transvaal, Natal, Cape of Good Hope), **Tanzania** (Lindi, Zanzibar), **Malawi, Zimbabwe, Zambia, Uganda, Zaire**.

Belonogaster clypeata fuscata subsp. n.

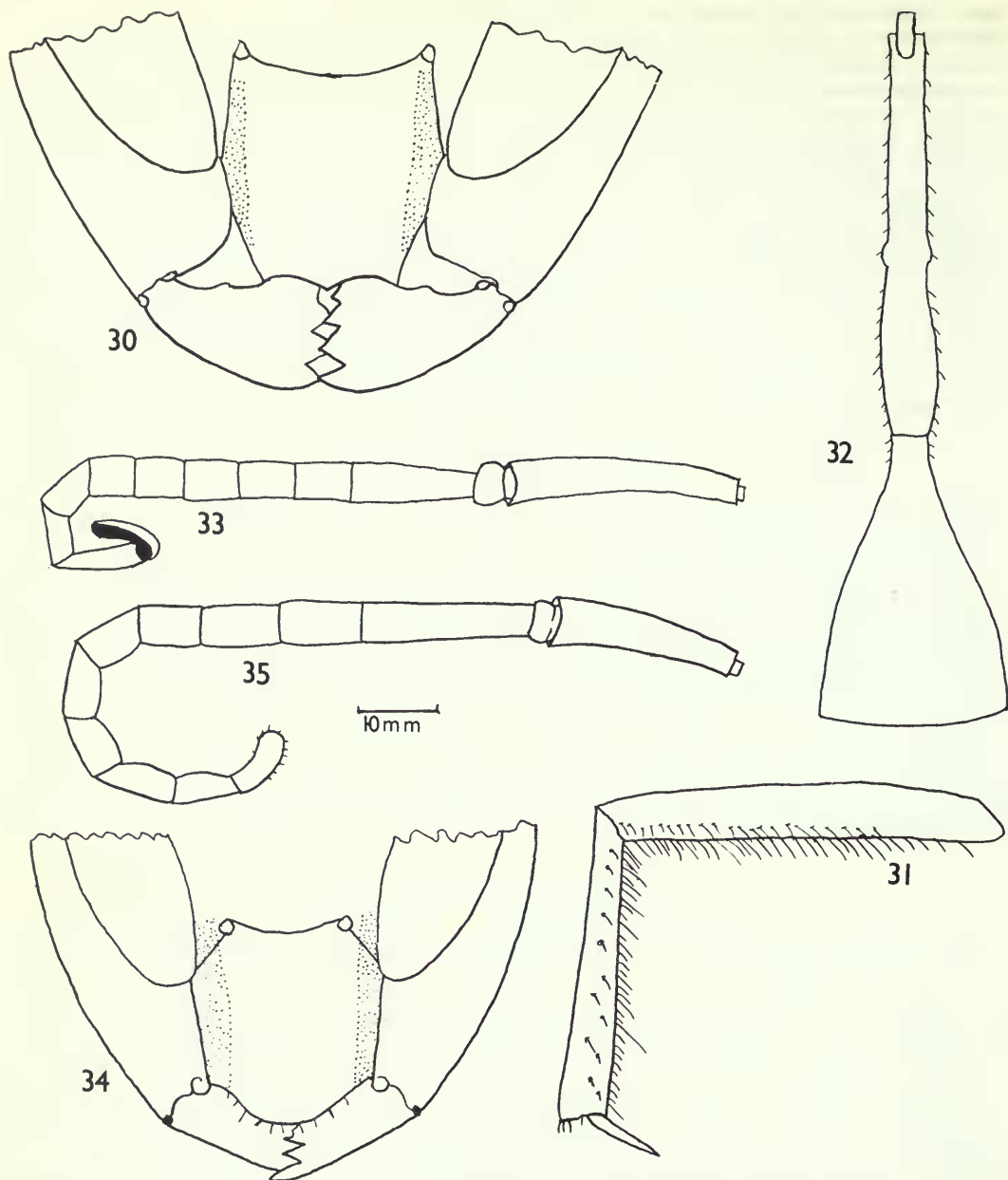
FEMALE. Colour more black and less ferruginous. Mesosoma and gastral tergites 3–4 usually black. Coxae and femora usually black. Propodeal hairs black. Posterior tergites with more or less black bristles protruding through the tomentum.

MALE. Colour much as in female; sides of clypeus with more extensive yellow stripes than *C. clypeata*.

Holotype, ♀, **Uganda**: Ankole-Toro border, east of Lake George, 4500 ft [1370 m], 20–21.x.1911 (*S. A. Neave*) (BMNH).

Paratypes. **Uganda**: 1 ♀, southern Toro, Mbarara, Fort Portal Rd, 3800–4200 ft [1160–1280 m], 22–24.x.1911 (*S. A. Neave*) (BMNH); 1 ♀, eastern Mbale district, south of Mt Elgon, 3700–3900 ft [1130–1190 m], 2–5.viii.1911 (*S. A. Neave*); 1 ♀, Mzozzi, i.1903 (*Delme Ratcliffe*); 1 ♀, north of Lake Isolt, 3700 ft [1130 m], 4–6.i.1912 (*S. A. Neave*); 1 ♀, Entebbe, xi.1912 (*C. C. Gowdey*) (BMNH). **Zambia**: 1 ♂, 1 ♀, Mporokoso, 4500 ft [1370 m], 20.vii.–3.viii.1908 (*S. A. Neave*) (UM, Oxford); 1 ♀, Upper Kalongwisi Valley, 4200 ft [1280 m], 25.vii.1908 (*S. A. Neave*); 1 ♀, High Plateau S. of L. Tanganyika, 4500 ft [1370 m], 18–21.viii.1908 (*S. A. Neave*); 2 ♀, N. shore of Lake Bangweolo, 3800 ft [1160 m], 14.vi.1908 (*S. A. Neave*); 1 ♂, 1 ♀, N. of L. Bangweolo, Lawinga, 4200 ft [1280 m], 17.vii.–13.viii.1908 (*S. A. Neave*) (UM, Oxford). **Angola**: 1 ♀, Chianga, 21–24.iii.1972 (*Southern African Exped.*) (BMNH); 1 ♂, Mt Labiri, 10 miles [16 km] NW. Alto-Hama, 7.iii.1972 (*Southern African Exped.*). **Zaire**: 2 ♀, Katanga (Shaba), Kambove, 13.ii.1907 (*S. A. Neave*); 1 ♀, Katanga (Shaba), 5.viii.1907 (*S. A. Neave*); 1 ♀, Katanga (Shaba), 150–200 miles [240–320 km] W. of Kambove, 3500–4500 ft [1070–1370 m], 18.x.1907 (*S. A. Neave*); 1 ♀, Katentanio, 1600 m, i.viii.1946 (BMNH).

A ♀ of subsp. *clypeata* from **Zimbabwe**: Salisbury, iv.1902 (*G. A. K. Marshall*) (BMNH) has the puparium of a ♀ Strepsipteran beneath gastral tergite 4 on the right.



Figs 30–35 *Belogaster*. 30, 31, *B. clypeata clypeata* Kohl, ♂. (30) clypeus; (31) left hind femur and tibia. 32, *B. lateritia* Gerstaecker, ♀, gastral tergites 1–2. 33, 34, *B. brachystoma* Kohl, ♂. (33) left antenna; (34) clypeus. 35, *B. freyi* du Buysson, ♂, left antenna.

Belogaster brachystoma Kohl

(Figs 33–34)

Belogaster brachystomus Kohl, 1894: 322, 376. LECTOTYPE ♂, MOZAMBIQUE: Delagoa Bay (NM, Vienna), here designated [examined].

FEMALE. Entirely ferruginous, gastral tergite 2 with two large comma-shaped pale yellow spots; sometimes

mesoscutum and gastral tergites 3–4 rather darkened. Wings light red-brown, tips a little darker, length 18·0 mm.

Clypeus acute below, ventral quarter a little more shining with large shallow punctures bearing pale bristles, dorsally dull granulate, not punctured, without bristles, only sparse tomentum. Frons dull, hardly punctured and hardly any projecting hairs but close pale brown tomentum. Gena as wide as eye in profile. Antennal segment 3 about as long as 4 + 5 + 6, 4 and 5 hardly longer than broad, 8 quadrate. Mesoscutum and humeri dull, granulate, not punctured with close long pale brown tomentum; mesopleuron with moderately numerous fine punctures almost hidden by the tomentum. Propodeum with a few striae on the angles, covered in dense pale brown tomentum but no outstanding hairs, posterior depression one-quarter as long as propodeum, impressed line complete but not strong, anterior depression large and deep. Last segment of fore tarsi elongate. Hind femur beneath with sparse whitish tomentum and a few white bristles. Gastral petiole moderately long and slender but distinctly widened distally, spiracles not at all projecting; stalk of second gastral tergite twice as long as broad; posterior tergites with close short pale tomentum and a few projecting pale bristles.

MALE. Head ferruginous, spot between antennal sockets, inner orbits to sinus, sides of clypeus rather narrowly, stalk of second gastral tergite chrome yellow. Mesosoma and legs ferruginous, front tarsi segments 1–2 mainly black above. Gaster ferruginous, tergite 2 with two large comma-shaped pale yellow apical spots. Wings red-brown, tips fuscous, length 18·0 mm.

Clypeus (Fig. 34) somewhat flattened, ventrally with a small rounded projection not reaching appreciably beyond the lateral lobes, end slightly bent downwards, surface finely granulate with almost no tomentum, anterior tentorial pit large; frons granulate, almost unpunctured, a few short brown bristles. Gena 1·33 as wide as eye in profile. Antenna (Fig. 33) with segment 3 a little longer than 4 + 5, 4 and 5 about twice as long as broad, 8 rather shorter, 12 much flattened and curved, underside normally shining black, upperside dull, dark ferruginous, about as long as 11, 11 flattened, 10 much shorter, neither with a raised line or prominence beneath, 9 much thicker than 10, 6–9 with a raised line beneath. Mesosoma as in the ♀. Last segment of fore tarsi elongate. Mid and hind trochanter and femur with dense pale hairs, longer on hind femur; hind tibia with sparser obliquely outstanding hairs. Gaster as in female but stalk of second gastral tergite usually a little shorter, sternite 7 flattened.

DISTRIBUTION (33 ♀, 7 ♂). **Zambia, Zimbabwe, Tanzania** (including Zanzibar), **Malawi, Mozambique, South Africa** (Natal, Transvaal).

Belonogaster freyi du Buysson

(Fig. 37)

Belonogaster freyi du Buysson, 1909: 255. Holotype ♀, SOUTH AFRICA (MHN, Geneva) [examined].

Belonogaster indicus de Saussure var. *claripennis* du Buysson, 1909: 259. Holotype ♀, TANZANIA: Kigonsera (10°40'S, 35°03'E) (MNHN, Paris) [examined]. **Syn. n.**

FEMALE. Ferruginous, patch on frons, sometimes posterior part of pronotum, mesoscutum, mesopleuron, propodeum except part adjacent to petiole, suffusion of apex of gastral tergite 2, tergites 3–4, black; apex of gastral tergite 2 with a large whitish yellow comma-shaped spot in 35 ♀ or spot small in 5 ♀ or no spot in 20 ♀. Wings light brown, tips a little darker, length 16·0–20·0 mm.

Clypeus acute below; dull, very finely granulate, lower half with scattered large punctures bearing very short brown bristles, tomentum pale, inconspicuous; frons with indistinct punctures, a few short outstanding pale bristles, tomentum silvery, not very dense; gena a little broader than eye in profile, dull, some fine punctures on lower third; base of submentum and stipes with a few long, pale bristles; antennal segment 3 nearly as long as 4 + 5 + 6, 4 and 5 little longer than broad, 8 about quadrate. Mesoscutum, humeri, scutellum and metanotum with indistinct, fine punctures, mesopleuron with punctures rather stronger and denser, tomentum fine, dense and pale; propodeum with silvery tomentum and on lower half with short outstanding pale bristles, with distinct punctures on sides and usually traces of striae on the angles; posterior depression hardly one-quarter as long as propodeum, impressed line weak, anterior depression triangular, usually small. Fifth segment of fore tarsi elongate. Hind femur beneath with pale tomentum and a few short pale bristles near base. Gastral petiole not very long, distinctly widened posteriorly, spiracles not at all prominent, stalk of second tergite about 1·5 times as long as broad, or even rather less, gaster posteriorly with very fine pale tomentum.

MALE. Coloured like the ♀ but mandibles, sides of clypeus and inner orbits to middle of sinus whitish; only 1 out of 9 specimens with small, transverse, white spots on gastral tergite 2. Clypeus with close outstanding white hairs on sides. Gena rather narrower than eye in profile. Antenna (Fig. 35) with segment 3 a little

longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 twice as long as broad, 12 moderately thick, curved; underside shining, about as long as 8, tip rounded, 11 appreciably narrower than 10, slightly swollen beneath, 10 markedly so, 7–11 with shining areas beneath which are elongate and a little convex.

DISTRIBUTION (114 ♀, 26 ♂). **South Africa** (Natal, Orange Free State, Transvaal), **Botswana, Tanzania, Malawi, Zimbabwe, Zambia, Kenya, Zaire.**

Belonogaster brunnescens sp. n.

Many of the specimens of this species in collections were identified as *B. brunnea*.

MALE. Ferruginous brown, mesoscutum, top part of propodeum, gastral tergites 3–4 a little darker. Upper part of clypeus and inner orbits slightly yellow tinged. Wings yellow-brown, tips scarcely darker, length 20.0–21.0 mm.

Clypeus obtusely pointed below, dull, lower fifth shining with two or three large punctures, upper part with white tomentum and some outstanding black hairs, anterior tentorial pit very large; frons with close, fairly coarse punctures, appressed white tomentum and fine outstanding black hairs; gena two-thirds as wide as eye in profile, surface dull, not punctured; antenna with segment 3 as long as 4 + 5, 4 and 5 about 3 times as long as broad, 8 nearly twice as long as broad, 12 slightly flattened, well curved, tip rounded, a little longer than 11, 9–11 with a strong rounded hump beneath, 6–8 with a weak raised line beneath. Mesoscutum, humeri, scutellum, metanotum and mesopleuron with inconspicuous close punctures and rather close pale tomentum. Propodeum with no striae but rather close fine punctures, dense white tomentum and moderately dense pale outstanding hairs, posterior depression about one-third as long as propodeum, impressed line strong on lower half, anterior depression small, triangular, deep. Last segment of fore tarsus elongate. Mid and hind coxae with tomentum but no hairs. Hind femur beneath with rather dense white tomentum. Gastral petiole moderately long and stout, little widened posteriorly, spiracles strongly projecting; stalk of second gastral segment rather more than twice as long as broad, gaster posteriorly with close white tomentum but no projecting bristles.

FEMALE. Light ferruginous. Antennae and four hind tarsi sometimes blackish. Wings light brownish hyaline, tips very little darker, length 17.0–24.0 mm.

Clypeus acute below, finely reticulate with scattered large punctures on ventral half, short outstanding brown bristles, dorsal two-thirds without close pale tomentum; frons dull, reticulate with inconspicuous small punctures and short outstanding brown bristles. Gena as wide as eye in profile, finely reticulate, a little more shining below where there are scattered small punctures; base of submentum and stipes with a few long pale hairs; antennal segment 3 much longer than 4 + 5, 4 and 5 distinctly longer than broad, 8 almost quadrate. Mesoscutum, humeri and mesopleuron dull, granulate with a few inconspicuous punctures when not rubbed with numerous short pale hairs and inconspicuous pale tomentum. Scutellum and metanotum rather more clearly punctured, former with an impressed line on front half. Propodeum dull granulate, angles weakly striate, surface with not very close white tomentum and rather numerous short outstanding brown bristles; posterior depression rather less than half as long as propodeum, impressed line strong but short, anterior depression small but deep. Last segment of fore tarsus elongate. Femora beneath with not very close tomentum and a few short brown bristles. Gastral petiole rather long, proximally narrow, posteriorly distinctly widened, spiracles moderately prominent, hairs few and short; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with close silvery tomentum and no bristles.

Holotype ♂, **Zimbabwe:** Mashonaland, 1894 (*G. A. K. Marshall*) (BMNH).

Paratypes. **Ethiopia:** 1 ♀, equatorial region, Gofa, Basketo-Dimé, 1909 (*Mission du Bourg de Bozas*) (MNHN, Paris). **Gabon:** 1 ♀, 1883 (*Duparquet*) (MNHN, Paris). **Congo:** 2 ♀, Libreville, 1899 (*J. Bonher*); 1 ♀, Fernand-Vaz, ix.–x.1902 (*L. Fea*); 2 ♀, San Benito, 1885 (*Guiral*); 1 ♀, Ogoué, chutes de Doumé, iii.1881 (MNHN, Paris). **Zaire:** 1 ♀, 150–200 miles [240–320 km] N. of Kambove, 3500–4500 ft [1070–1370 m], 26.x.1907 (*S. A. Neave*) (BMNH). **Zimbabwe:** 26 ♀, near Chirinda, Gazaland, viii.1907 (*G. A. K. Marshall*); 18 ♀, Chirinda, SE. Mashonaland, 10.viii.1907 (*G. A. K. Marshall*); 6 ♀, 13–24.viii.1907 (*G. A. K. Marshall*); 1 ♂, Mashonaland, 1894 (*G. A. K. Marshall*) (BMNH). **Zambia:** 3 ♀, Upper Luangwa Valley, 1800–2000 ft [550–610 m], 21.iii.–17.v.1908 (*S. A. Neave*) (UM, Oxford); 1 ♂, Mid Luangwa Valley, 2000 ft [610 m], 14–16.viii.1900 (*S. A. Neave*) (BMNH); 1 ♀, East Luangwa distr., Petauke, 2400 ft [730 m], 9–13.i.1915 (UM, Oxford). **Kenya:** 1 ♀, 'Brit. East Africa', 1894 (*Dr J. W. Gregory*) (BMNH); 1 ♀, Kitale distr., Trans-Nzoia, i.–iv.1955 (*E. M. Waterfield*); 1 ♀, Mombasa, 2.i.1913 (*R. C. Wroughton*) (BMNH). **Uganda:** 1 ♀, Jinja, iii.–iv.1932 (*V. G. L. van Someren*); 1 ♂, Kawanda, 4.v.1942 (*T. H. C. Taylor*). **Mozambique:** 1 ♂, Zambesi, Caia, 8.xii.1912 (*H. Swale*) (BMNH). **Malawi:** 1 ♂, Cape Maclean, 18.iv.1973 (*C. G. M. Schulten*) (ITZ, Amsterdam) (variety with legs dark and sides of clypeus broadly white). **Tanzania:** 1 ♀, 14.xii.1906 (*A. F. R.*

Wollaston) (BMNH); 1 ♂, Zanzibar, (*Staudinger*) (RNH, Leiden). **South Africa:** 1 ♀, Transvaal, Kruger National Park, 27.xi.1954 (BMNH); 1 ♂, 1 ♀, Soutpansberg, 800 m, vii. (*G. A. J. Rothney ex H. Rolle*) (UM, Oxford).

Belonogaster maculata sp. n.

FEMALE. Head ferruginous, antennae above almost entirely, frons, black. Mesosoma black, ventral point of pronotum and posterior depression of propodeum ferruginous; legs black, stripe on last segment of fore tarsus reddish. Gaster black, petiole and anterior half of second segment, ferruginous; large, closely approximating triangular spots on tergite 2, yellow (1 specimen) or a pair of small spots at apex of tergite 2 also yellow (5 specimens) or besides these four spots, a pair of small spots on gastral tergites 3 and 4 (4 specimens). Wings pale brown, tips hardly darker, venation yellow brown, length 16.0–18.0 mm.

Clypeus acute below, surface with scattered but sparse large punctures bearing short black bristles on whole surface, finely reticulate, more weakly below where it is shining, sparse whitish tomentum, especially dorsally; frons coarsely reticulate with quite close, moderately strong punctures bearing outstanding black bristles. Gena not quite as wide as eye in profile, surface feeble, reticulate with numerous small punctures. Antenna with segment 3 nearly as long as 4 + 5 + 6, 4 nearly 1.5 times as long as broad, 5 a little longer than broad, segment not quite as long as broad. Base of stipes and submentum with a few long bristles. Humeri and mesoscutum dull with quite numerous but not very conspicuous small punctures and close, pale brown, fine tomentum and scattered subappressed, fine short bristles; mesopleuron with numerous rather small punctures and similar tomentum; scutellum and metanotum with closely and rather larger punctures; propodeum rather closely and strongly punctured, angles more punctate-striate, scattered moderately long pale hairs on angles, surface generally with pale brown tomentum; posterior depression nearly one-third as long as propodeum, impressed line to about the mid point, anterior depression small but deep. Femora beneath with inconspicuous tomentum and scattered short rather pale bristles; last segment of fore tarsus elongate. Gastral petiole moderately long, distinctly widened posteriorly, spiracles moderately prominent, tomentum rather close, sides with some outstanding hairs; stalk of second gastral tergite 1.5–2.0 times as long as broad; posterior tergites with close pale tomentum through which short, rather fine, black bristles protrude.

MALE. Not seen.

Holotype ♀, **Uganda:** eastern Mbale district, S. of Mt Elgon, 2700–3000 ft [820–915 m], 2.–5.viii.1911 (*S. A. Neave*) (UM, Oxford).

Paratypes **Uganda:** 3 ♀, same data as holotype; 2 ♀, between Jinja and Busia, E. Busoga, 3800–4000 ft [1160–1220 m], 28.vii.–1.viii.1911 (*S. A. Neave*). **Kenya:** 2 ♀, Yala River, S. edge Kakamega Forest, 4800–5300 ft [1460–1620 m], 21–28.v.1911 (*S. A. Neave*); 1 ♀, Ilaba, Marathas district, 14 miles [22.5 km] E. of Mumias, 4500 ft [1370 m], 9–12.v.1911 (*S. A. Neave*). All in UM, Oxford except 1 ♀ (Uganda) and 1 ♀ (Kenya) now in BMNH.

Belonogaster petiolata (Degeer)

(Figs 36, 37)

Vespa petiolata Degeer, 1778, 7: 610, pl. 45, fig. 10, Holotype ♀, no locality (NR, Stockholm) [examined].

? *Vespa linearis* Olivier, 1792: 673. Type, SOUTH AFRICA: Cape of Good Hope (lost).

Belonogaster brachycerus Kohl, 1894: 323, 331, pl. 15, fig. 78, pl. 17, fig. 136. Holotype ♀, SOUTH AFRICA: 'Cap b. sp.' (depository unknown).

B. brachycera was described by Kohl from (apparently) 1 ♀ from the Cape of Good Hope (NM, Vienna). There seems in the Vienna collection to be some confusion in the labelling between *B. brachystoma* and *B. brachycera* but there was no ♀ amongst the type-material from Cape of Good Hope. Nevertheless, from Kohl's description and figures there is little doubt what his species was.

The female is very close to *B. lateritia*, but the males have different antennae.

FEMALE. Colour like the male but often rather more ferruginous. Clypeus and adjacent parts of the head more or less yellow suffused. Wing-length 17.0–19.5 mm.

Clypeus acutely pointed below, moderately shining, very finely reticulate, whole surface with scattered moderate-sized punctures bearing short black bristles and sparse pale tomentum. Frons dull, reticulate with scattered black bristles. Antenna as in Fig. 36. Posterior gastral tergites with sometimes a few protruding, fine black bristles.

MALE. Head ferruginous, usually much of the frons black. Sides of clypeus to the bottom of the ocular sinus and spot between the antennal sockets, yellow. Antennae with segments 9–11 yellow. Mesosoma usually mainly black, only rarely with a ferruginous tinge or even with considerable ferruginous areas. Legs ferruginous, hind femora often partly blackish. Gaster ferruginous, gastral tergite 2 with two large triangular yellow spots; apical area of tergite 2 between the spots and much of tergites 3–5 more or less blackened; sternites more or less blackened. Wings red-brown, tips darkened, length 17.0–18.0 mm.

Clypeus acute below but not protruding far, punctured at sides quite closely but hidden by dense silvery pubescence, disk with scattered short, black outstanding bristles, clypeus transversely convex above but flattened below, anterior tentorial pits large and deep. Frons dull, reticulate, with close rather large punctures, close silvery tomentum and outstanding short black bristles. Gena dull, reticulate with sparse small punctures, a little wider than eye. Antenna (Fig. 37) with segment 3 clearly longer than 4 + 5, neither 4 nor 5 twice as long as broad, even 4 not nearly so, segments 8–10 with slightly raised elongate area beneath, 10–11 cylindrical, 12 long (longer than 4), rather thin cylindrical curved, dull with microscopic hairs, tip rounded. Mesoscutum with scattered small punctures, rather fewer on humeri, many on mesopleuron, mesoscutum and humeri with not very close silvery tomentum and close short black outstanding hairs or bristles. Scutellum and metanotum distinctly punctured, former with a weak impressed line. Propodeum reticulate with scattered black bristles, posterior depression one-third as long as propodeum, impressed line moderate to mid-point, anterior depression small and deep. Last segment of front tarsi long. Hind femur beneath with silvery tomentum and a few suberect black bristles and a few white ones. Gaster with petiole moderately long, almost parallel-sided, spiracles prominent; stalk of second tergite rather longer than broad (1.0–1.5 times), gaster posteriorly without protruding black bristles, tomentum silvery, rather close.

DISTRIBUTION (19 ♀, 46 ♂). **South Africa** (Cape of Good Hope, Orange Free State, Transvaal, Natal), **Lesotho, Malawi, Zimbabwe.**

The female differs from *B. lateritia* in having the clypeus often more punctured dorsally; antennal (Fig. 36) segment 4 usually a little shorter and almost quadrate; humeri and mesoscutum with more distinct short bristles and the general colour usually blacker.

A male, South Africa: Cape of Good Hope, Aliwal North, xii.1922 (*R. E. Turner*) (BMNH) has the puparium of a ♂ Strepsipteran beneath the centre of gastral tergite 5.

Belonogaster lateritia Gerstaecker

(Figs 32, 38)

Belonogaster lateritius Gerstaecker, 1855: 463. Syntypes ♀, MOZAMBIQUE (*W. C. Peters*) (MNHU, Berlin) [fragments examined].

Belonogaster elegans Gerstaecker, 1862: 468, pl. 30, fig. 8. Holotype, MOZAMBIQUE: Inhambane (depository unknown).

Belonogaster fleckii Kohl, 1894: 332. LECTOTYPE ♀, SOUTH WEST AFRICA ('Damaraland') (*Dr Fleck*) (NH, Vienna), here designated [examined].

Belonogaster agilis Kohl, 1893: 187, figs 1, 4, 9, 10, 15. LECTOTYPE ♂, ANGOLA (NH, Vienna), here designated [examined].

The syntypes of *B. lateritius* are represented in MNHU, Berlin by fragments (the wings, one foreleg, most of one antenna) of a ♀ labelled 'Type Mozambique Peters'. As far as can be judged, it is the same species as other specimens I have seen from that region.

No syntypes of *B. elegans* seem to exist, but it appears to have been a colour variant of *B. lateritius*.

B. fleckii was described from 2 ♀ and one was examined and is here designated lectotype. *B. agilis* was described from several ♂ ♀ from Angola; 4 ♂, 1 ♀ were examined and 1 ♂ has been labelled lectotype.

MALE, FEMALE. Colour generally ferruginous but mesosoma and hind femora sometimes rather darkened. Femals usually with fewer punctures on dorsal half of clypeus, wing-length 16.0–20.0 mm, wing-tips often little darkened. Antenna with segment 4 usually distinctly a little longer than broad, though 5 about quadrate. Mesosoma rarely much blackened, bristles on humeri and mesoscutum rarely much developed and nearly always pale. Mesoscutum and humeri usually less punctured. Gaster as in Fig. 32. As in *B. petiolata* the amount of yellow on the face is rather variable. Male with antennal (Fig. 38) segment 3 a little longer than 4 + 5, 4 and 5 clearly a little more than twice as long as broad, 5 about 2.5 times, 8 twice as long

as broad, 12 very long (as long as 5), thin, cylindrical, strongly curved, tip rounded, a number of very short hairs above, shining beneath, 9–11 cylindrical, little protuberant beneath, though 9–10 have an obtuse raised area, 6–8 with distinct raised lines.

DISTRIBUTION (218 ♀, 25 ♂). **Angola, South West Africa, Botswana, South Africa** (Cape of Good Hope, Orange Free State, Natal, Transvaal), **Lesotho, Tanzania, Mozambique, Kenya** (Mombasa), **Malawi, Zimbabwe, Zambia**.

Three specimens have been seen parasitized by Strepsiptera. Malawi: 1 ♂, SW. shore L. Malawi, between Ft Johnston and Monkey Bay, 1650 ft [500 m], 25.ii–4.iii.1910 (*S. A. Neave*) (BMNH), empty ♂ puparium under gastral tergite 5 on right. Mozambique: 1 ♀, Beira, vi.1902 (*J. Ogilvie*) (BMNH), ♂ puparium beneath tergite on right; ♀, Delagoa Bay, 1883 (BMNH), ♂ puparium under gastral tergite 3 on left.

Belonogaster tarsata Kohl

(Figs 39–41)

Belonogaster tarsatus Kohl, 1893: 187, figs 2, 5, 7, 8, 11, 16. **LECTOTYPE** ♂, **TANZANIA**: 'E. Africa, Mbusini' (*F. Stuhlmann*) (NH, Vienna), here designated [examined].

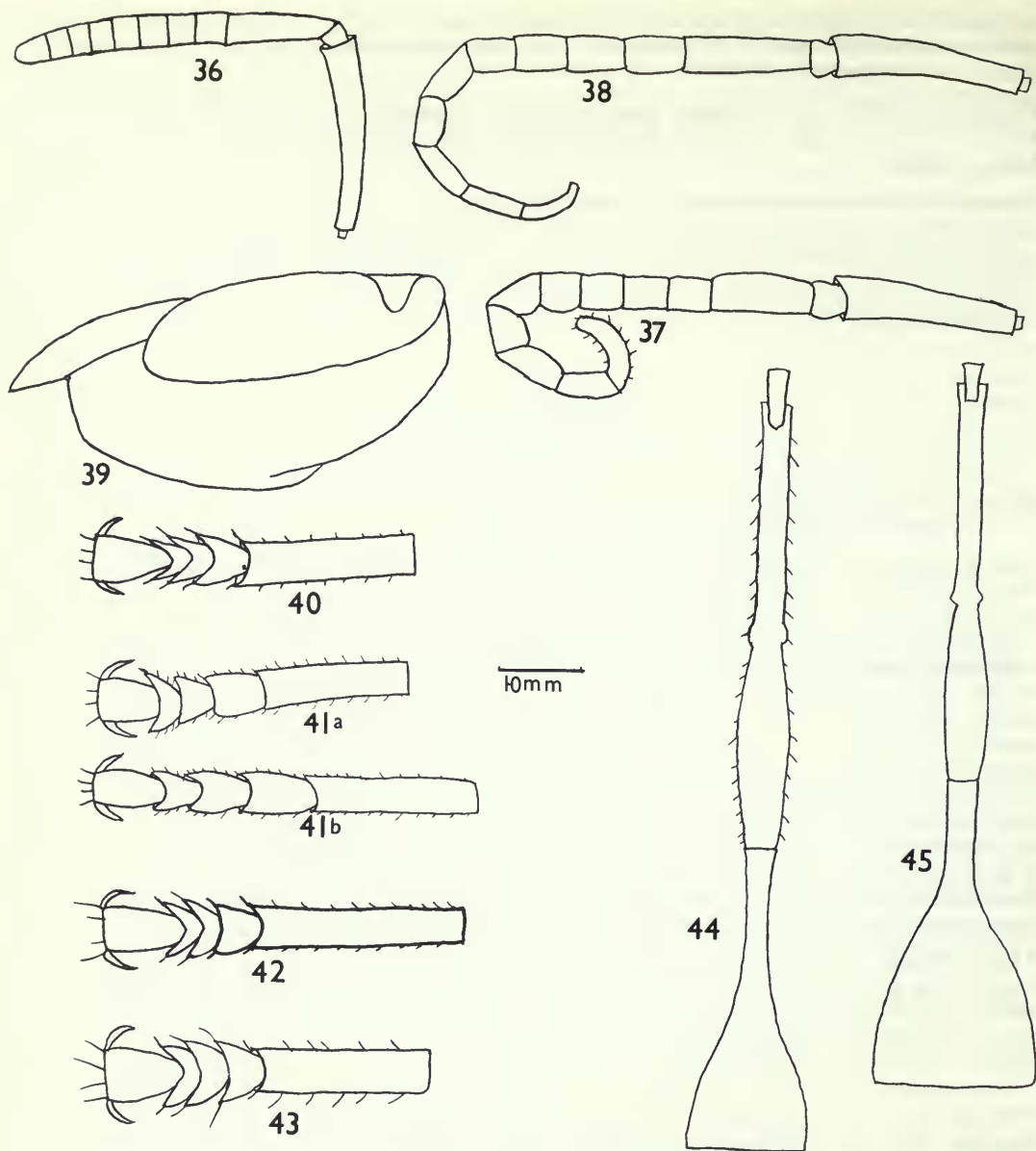
FEMALE. Head including the antennae, ferruginous; clypeus (except a narrow ferruginous mid line) and broad inner orbits, yellow. Mesosoma and legs ferruginous. Gaster rather dark ferruginous, tergite 2 with two small yellow spots. Wings light reddish brown, tips hardly darker, length 18.0 mm.

Clypeus acute below, very finely reticulate, a little shining, with pale hairs and no visible tomentum, some rather large punctures on ventral quarter. Frons reticulate, not punctured, some very short outstanding bristles, very little tomentum. Gena (Fig. 39) nearly 1.5 times as wide as eye in profile, very fine reticulate, shining, especially below where there is a moderate number of medium sized punctures; antennal segment 3 almost as long as 4 + 5 + 6, 4 and 5 hardly longer than broad, 8 rather shorter. Mesoscutum and humeri rather finely granulate, not punctured, with inconspicuous brownish tomentum, mesopleuron similar, without punctures; scutellum hardly punctured, with a strong median line. Propodeum with punctures and short black hairs at sides, no real striae but a little brownish tomentum; posterior depression not quite half as long as propodeum, impressed line moderately strong, complete, anterior depression strong, deep. Fore tarsus (Fig. 40) rather short, other tarsi normal. Hind femur beneath with a moderate number of short pale bristles. Gastral petiole moderately long, distinctly widened behind; stalk of second gastral tergite about 1.5 times as long as broad; gaster posteriorly with close brownish tomentum and no protruding bristles.

MALE. Ferruginous; mesosoma and gaster behind the petiole mottled with black. Whole face up to top of ocular sinus white except for a narrow brown central stripe on clypeus; antennal segments 1–2 white beneath. Mesosternum, fore and mid coxae beneath, anterior stripe on mid femur, short basal stripe on hind femur, two small oval spots on gastral tergite 2, spot on malar space, and most of outer side of mandibles, yellow. Frons black. Wings light fuscous, length 17.5 mm.

Clypeus feebly angularly produced below, unpunctured with dense silvery tomentum, especially at sides; frons with dense greyish tomentum with scattered fine punctures bearing short fine black bristles. Gena about as wide as eye in profile; antennal segment 3 clearly longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 rather shorter, 7–12 paler yellowish, 8–11 practically cylindrical, 12 longer than 9, 10 or 11, gently bent, more above than below, shining, slightly flattened. Mesoscutum blackish, effectively unpunctured with inconspicuous greyish tomentum, humeri unpunctured with dense pale tomentum; mesopleuron unpunctured, slightly shining. Fore tarsus (Fig. 41) short, a little broadened, with fine tomentum and some bristles at sides, femur with dense whitish tomentum beneath; mid and hind tibiae and tarsi (Fig. 41) unusually shining with fine, pale, inconspicuous tomentum but no bristles, slightly shortened; mid and hind femora with white moderately dense tomentum beneath. Propodeum with moderately close coarse punctures, no striae except at edge of posterior depression which is nearly half as long as propodeum, impressed line weak but complete, anterior depression rather large, deep surface with pale inconspicuous tomentum. Gastral petiole rather short, gently widened to a little before apex, stalk of second gastral tergite as long as broad, gaster posteriorly without protruding bristles, with inconspicuous tomentum.

DISTRIBUTION. **Tanzania:** Kohl's material; 1 ♂, M'Busini Ousegouba, 1907 (*M. von Broun*); 1 ♀, Zanzibar, 1887 (*Le Roy*) (MNHN, Paris); 1 ♀, Wanii River, near Msata (just N. of Dar-es-Salaam), 6.vi.1945 (*T. Clifton*) (BMNH).



Figs 36–45 *Belonogaster*. 36, 37, *B. petiolata* (Degeer). (36) ♀, left antenna; (37) ♂, left antenna. 38, *B. laterita* Gerstaecker, ♂, left antenna. 39–41, *B. tarsata* Kohl. (39) ♀, left gena; (40) ♀, fore tarsus; (41) ♂, fore (a) and mid (b) tarsi. 42, *B. turbulenta* Kohl, ♀, fore tarsus. 43, 44, *B. flava* sp. n., ♀. (43) fore tarsus; (44) gastral tergites 1–2. 45, *B. filiventris* (de Saussure), ♀, gastral tergites 1–2.

Belonogaster turbulenta Kohl

(Fig. 42)

Belonogaster turbulentus Kohl, 1894: 323, 330, pl. 15, fig. 87, pl. 17, fig. 147. Holotype ♀, SIERRA LEONE (*Moquerys*) (NM, Vienna) [examined].

FEMALE. Pale yellowish brown, clypeus and malar space really yellow; gaster, especially the stalk of second tergite, a little darker. Wings yellowish brown, length 17.0 mm.

Clypeus acute below, convex, dull and finely reticulate, not punctured, with short outstanding pale hairs. Frons dull, granulate, punctured in holotype but not in other specimens, with short outstanding pale hairs. Gena rather more than half as wide as eye in profile, rather dull. Antennal segment 3 nearly as long as 4 + 5 + 6, 4 and 5 about 1.5 times as long as broad, 8 a little longer than broad. Mesoscutum dull, granulate, unpunctured, tomentum very inconspicuous, very short outstanding hairs, humeri similar, mesopleuron similar but without hairs. Propodeum dull, unpunctured, traces of striae on angles, sparse tomentum and a few hairs; posterior depression one-third as long as propodeum, impressed line weak, anterior depression practically obsolete. Legs very long and thin, fore tarsus (Fig. 42) with last segment elongate, hind femur with numerous rather long pale hairs beneath. Gastral petiole very long and slender but posterior part markedly thicker, petiole beneath with hairs; stalk of second gastral tergite about 4 times as long as broad, gaster posteriorly with rather close tomentum but no bristles.

MALE. Not seen.

DISTRIBUTION. **Sierra Leone:** 1 ♀ *Kohl*; 1 ♀ (*E. André*, 1900) (MNHN, Paris) (dark form with top of head, mesoscutum and gaster posteriorly, blackish). ? **Congo:** 2 ♀, San Benito, 1885 (*Guiral*) (MNHN, Paris). **Congo:** 1 ♀, Ogooné, Sam Kita, 1910 (*R. Ellenberger*) (MNHN, Paris). ? **Zaire:** 1 ♀, 'Congo', Luebo (*D. W. Snyder*) (USNM, Washington).

The specimen from Sierra Leone in MNHN, Paris was placed under *B. filiventris*. The variety mentioned by du Buysson (1909: 24) is described below under *B. flava*.

Belonogaster flava sp. n.

(Figs 43, 44)

FEMALE. Head ferruginous, mandibles except teeth, clypeus, inner orbits to sinus, spot between antennal sockets, whole gena to near the top of the eye, malar space, scape beneath, pale yellow; small patch round ocelli, antennal segments 1–9 or in paratypes 1–3, blackish. Thorax pale yellow, anterior spot on pronotum, large humeral spot, mesoscutum except two short posterior lines, square, central spot of scutellum dark red-brown. Propodeum pale yellow, large inverted U-shaped spot red-brown. Tegula brown with wide inner margin, yellow; humeral plate yellow. Legs yellow, tarsi black, mid and hind tibiae brownish, mid pair with a yellow basal dorsal spot; mid and hind femora brownish above. Gaster dark brown or in paratypes, black, sides of petiole, large almost joined spots on tergite 2, narrow transverse lunules on tergite 3–4, pale yellow; sternite 1 dark brown except near apex; sternite 2 with its broad part yellow, 3–5 light brown with small lateral apical pale lunules, 6 brown. Wings rather dark red-brown, length 18.0 mm.

Clypeus acute below, finely granulate, some large punctures on the lower quarter, bristles pale, fine and sparse. Frons dull, hardly punctured with some brown or black bristles. Gena two-thirds or in paratypes half as wide as eye in profile, surface reticulate, scarcely punctured. Antennal segment 3 not quite as long as 4 + 5 + 6, 4 and 5 just longer than broad, 8 similar. Mesoscutum dull, finely granulate, not punctured, no hairs, brown tomentum not dense. Mesopleuron similar. Scutellum with no impressed line in the holotype but a fine one in the paratypes, it and the metanotum dull, granulate. Propodeum in holotype more coarsely granulate, posteriorly almost finely clathrate but evenly granulate in the paratypes, bristles short and brown, posterior depression one-quarter as long as propodeum, impressed line to mid point, anterior depression broad and shallow. Last segment of fore tarsi (Fig. 43) rather short. Hind femur beneath with numerous, moderately long, black bristles. Gastral petiole (Fig. 44) long, slender, distinctly widened at apex, spiracles not strongly projecting, petiole with scattered long hairs beneath, in paratypes with the posterior wide part a little shorter and wider; stalk of second gastral tergite (Fig. 44) 5 times as long as broad, or in paratypes 4–5 times and a little wider; gaster posterior with moderately dense brown tomentum, denser in the paratypes.

MALE. Not seen.

Holotype ♀, **Uganda:** Budongo Forest, Unyoro, 3400 ft [1040 m], 11–15.xii.1911 (*S. A. Neave*) (BMNH).

Paratypes. **Cameroun:** 2 ♀, north, Joh.-Albrechtshöhe, 21.xi.1895, ii.1896 (*L. Conradt*) (MNHN, Paris).

The paratypes are the two females mentioned by du Buysson (1909: 240) as a variety of *B. turbulenta*. The specimen mentioned by du Buysson with a ♀ stylops puparium on the right of tergite 4 was not found.

Belonogaster filiventris (de Saussure)

(Figs 45–47)

Raphigaster filiventris de Saussure, 1853: 16, pl. 2, fig. 5. Holotype ♀, ? SENEGAL (MNHN, Paris) [examined].
Belonogaster filiventris (de Saussure) Smith, 1857: 94.

Belonogaster gracilis Cameron, 1910: 173. LECTOTYPE ♀, TANZANIA: Kilimandjaro, Kibonoto, cultivated zone, 1300–1900 m, April–May (*Sjöstedt*) (NR, Stockholm), here designated [examined]. **Syn. n.**
Belonogaster sexmaculatus Cameron, 1910: 174. Holotype ♂, TANZANIA: Kilimandjaro, Kibonoto, cultivated zone, May (*Sjöstedt*) (NR, Stockholm) [examined]. **Syn. n.**
Belonogaster buyssoni Meade-Waldo, 1911: 99. Holotype ♀, NIGERIA: south, Iganga, Busuga (*J. J. Simpson*) (BMNH) [examined]. **Syn. n.**

The holotype of this species in MNHN, Paris is labelled 'Cayenne, *Bosc*, 1828'. As du Buysson points out, this must be incorrect and the specimen must be African, though as the species seems to be widespread it need not have come from West Africa; de Saussure's locality '? Sénégal' is only a guess. The specimen is a female with no fore legs and the gaster seems to have no yellow spots as indicated by the description.

By tradition, the species described below is given this name, but without the fore tarsi it is difficult to be sure of its identity. The series under this name at Paris seemed to me to include at least five other species (*B. kohli*, *B. nigricans*, *B. longitarsus*, *B. turbulenta* and a species near *B. jordani*).

The holotype of *B. buyssoni* also has no complete fore tarsus but a topoparatype sent to Paris by Meade-Waldo is certainly the present species.

The holotype of *B. sexmaculata* is a troublesome specimen, very dirty and with only segments 1–10 of one antenna preserved. I believe it belongs here, though the other 4 males I have seen have only 2 yellow spots on the gaster, not six. Von Schulthess thought that *B. sexmaculata* was the male (then undescribed) of *B. facialis*. This is possible but I think the narrow gena, narrow gastral petiole and stalk to the second gastral tergite make the present synonymy more likely. The female in any case has 0–6 yellow spots on the gaster.

FEMALE. Head ferruginous, antennae more or less blackened above. Mesosoma ferruginous, humeri and mesoscutum blackened, patch on mesopleuron and sides of propodeum a little darker. Legs ferruginous, fore tarsi, mid and hind femora, tibiae and tarsi, darkened, more or less black. Gaster black, petiole and stalk of second tergite, ferruginous with or without a pair of spots on tergites 2, 2 + 3, or 2 + 3 + 4 (in 63♀, 41 no spots, 16 two spots, 5 four spots, 1 six spots). Wings reddish brown, tips not darker, length 17.5 mm.

Clypeus acute below with scattered large punctures on lower third, moderately shining, finely reticulate with very few black bristles except on lower quarter. Frons dull, reticulate with numerous moderately strong punctures, with sparse pale tomentum and many short outstanding black hairs on frons and occiput. Gena (Fig. 46) about half as broad as eye in profile, very finely reticulate, more tomentose above, more shining and punctured on malar space. Humeri and mesoscutum with numerous moderate punctures, rather close brownish tomentum and short outstanding hairs. Scutellum quite strongly punctured, central line weak. Mesopleuron with fine reticulation, scattered weak punctures posteriorly and moderately dense tomentum. Propodeum coarsely granulate, no striae and very few punctures, moderately close brown tomentum, many moderately short outstanding black hairs; posterior depression not quite half as long as propodeum, no impressed line, anterior depression very weak, transverse. Fore tarsus with last segment somewhat short. Mid and hind femur with a few black bristles at base beneath. Gastral petiole (Fig. 46) moderately long and slender, posterior end distinctly widened, spiracles moderately projecting; stalk (Fig. 45) of second gastral tergite about 3 times as long as broad; gaster posteriorly with close pale tomentum.

MALE. Light ferruginous; mandibles, broad sides of clypeus, usually whole inner orbits, space between antennal sockets, antennal segments 1–2 beneath, white; antennal segments 8–12 yellowish brown; mesosternum, fore and mid coxae beneath, broad anterior stripe on mid femur and tibia, dot at anterior apex of hind femur, white; mid and hind legs and central stripe on fore tarsi, blackish ferruginous. Gastral tergite 2 nearly always and sometimes 3 and 4 with two yellow spots before the apex, tergite 3 sometimes basally yellow suffused. Wings brownish hyaline, length 13.0–14.5 mm.

Mandibles parallel-sided, base with silvery hairs. Clypeus very obtusely rounded below, dull with dense silvery hairs especially at sides; central strips of clypeus with dark brown hairs; frons reticulate with inconspicuous close punctures and moderately long, outstanding, black hairs. Gena one-third as wide as eye in profile, dull, scarcely punctured. Antennal segment 3 about as long as 4 + 5, 4 and 5 at least 2.5 times as long as broad, 8 about twice as long as broad, 12 slightly flattened, cylindrical; distinctly curved, dull, with a few hairs, tip rounded, not quite as long as 11, 8–11 strongly prominent beneath 3–7 with a weak raised line beneath. Mesoscutum and pronotum granulate, not punctured, with dense silvery tomentum and quite long outstanding brown or black hairs; mesopleuron similar but rather more distinctly punctured; scutellum with a central impressed line. Propodeum weakly rugose with long, outstanding, brownish black hairs;

posterior depression one-quarter as long as propodeum, impressed line weak, anterior depression distinct, deep, transverse. Fore tarsus (Fig. 47) short and broad, last segment 1.5 times as long as broad; mid tarsus (Fig. 47) with segments 2-4 increasingly transverse, 5 in dorsal view oval, as long as 3 + 4. Hind basitarsus longer than the mid tibia. Hind femur with long blackish hairs beneath, especially at its base where they are nearly as long as the femoral diameter; hind tibia beneath with quite close, outstanding silvery hairs which are more than half as long as the tibial diameter. Gastral petiole slender, little widened posteriorly, spiracles scarcely protruding; stalk of second gastral tergite about 3 times as long as broad; gaster posteriorly with close, fine pale tomentum.

DISTRIBUTION (115 ♀ 16 ♂). **Liberia, Nigeria, Cameroun, Zaire, Angola, Zimbabwe, Zambia, Kenya, Uganda, Malawi, Mozambique, Tanzania, South Africa** (Natal, Transvaal, Cape of Good Hope).

Three specimens have been seen parasitized by Strepsiptera. Liberia: 1 ♀, Robts. Field, ix. (*N. H. L. Krauss*) (USNM, Washington), ♀ Strepsipteran pupa on left tergite 5; Zaire: 1 ♀, Katanga (Shaba), La Panda, 9.x.1920 (*J. Bequaert*) (stylops removed) (BMNH); Tanzania: 1 ♀ Marunga, 1-20.iii.1913 (*Lindner*) (BMNH), ♀ Strepsipteran pupa under tergite 4 on the right.

Belonogaster nigricans sp. n.

(Fig. 48)

FEMALE. Head black; clypeus except central spot above, inner orbits, mandibles, ferruginous; antennae black above, ferruginous beneath. Mesosoma black, scutellum and metanotum more or less reddish. Legs and gaster black. Wings grey, costal region brown, tips not darkened, length 17.0 mm.

Clypeus pointed below, lower half with irregular large punctures, finely reticulate with not very dense pale brown tomentum, a few black bristles on lower quarter. Frons dull, reticulate with fine punctures, outstanding short bristles and inconspicuous pale tomentum. Gena about half as wide as eye in profile, dull, finely granulate, not punctured. Antennal segment 3 longer than 4 + 5, 4 and 5 about 1.5 times as long as broad, 8 quadrate. Mesosoma moderately strongly granulate, not punctured, mesoscutum and humeri with short pale outstanding hairs and close brassy tomentum; mesopleuron with less close tomentum, no hairs. Propodeum dull, coarsely granulate, traces of dorsal punctures, large punctures on sides, no striae, some short brassy tomentum, dense short stout bristles, posterior depression rather less than half as long as propodeum, impressed line weak to near dorsum, anterior depression deep, very transverse. Last segment of fore tarsus elongate; hind femur with short oblique black hairs beneath, hind tibia with a few short bristles beneath. Gastral petiole (Fig. 48) narrow, moderately long, spiracles very prominent, moderately thickened to a little before apex then a little narrowed, many long hairs at sides and beneath; stalk (Fig. 48) of second tergite 2.5 times as long as broad; gaster posteriorly finely granulate, rather dull with fine pale tomentum and some longish oblique black hair-like bristles.

MALE. Not seen.

Holotype ♀, Congo: Dimonika, iv.1969 (*J. P. Grillot*) (MNHN, Paris). **Paratypes.** Congo: 1 ♀, between Sam-Quilo and N'Jolé, 1900 (*J. Bouyson*) (tomentum of mesoscutum apparently grey); 1 ♀, Lambarène, xi.-xii.1902 (*L. Fea*); 1 ♀, Bassin de l'Imindo, aff. del'Ogoué, 1961 (*J. Gravot & Cap. Cottés*) (MNHN, Paris).

Belonogaster kelnerpillautae sp. n.

FEMALE. Ferruginous, gastral segments 3-6 a little darker marbled, mid and hind tarsi black, fore tarsi a little darkened. Wings tinged with red-brown, length 16.5-18.0 mm.

Clypeus acute below, surface a little shining, feebly finely reticulate, a few large punctures on lower quarter, oblique short black bristles scattered all over and some inconspicuous brownish tomentum. Frons reticulate dull, with scattered small punctures and outstanding black bristles. Gena half as wide as eye in profile, very finely reticulate, more shining below with a few very small punctures. Stipes with rather numerous outstanding black hairs at base. Antennal segment 3 considerably longer than 4 + 5, 4 nearly twice as long as broad, 5 less than 1.5 times, 8 just longer than broad. Mesoscutum and humeri granulate, dull with very indistinct fine punctures, short outstanding hairs and not very close brown tomentum; mesopleuron similar but more distinctly punctured; scutellum granulate, hardly punctured with long black bristles, central line weak. Propodeum granulate, angles striate below, few punctures, long black bristles, posterior depression one-third as long as propodeum, impressed line weak to mid-point, anterior depression obsolete. Last segment of fore tarsus elongate; all femora with a moderate number of short black hairs

beneath; hind tibia with a moderate number of brownish oblique bristles beneath. Gastral petiole long and thin, especially proximally, spiracles rather prominent, distal part moderately swollen but narrowed before apex; stalk of second segment 3.5–4.0 times as long as broad, gaster posteriorly with moderately close brownish tomentum and numerous black hair-like bristles protruding from it.

MALE. Not seen.

Holotype ♀, **Congo**: Dimonika, 18–30.i.1977 (*S. Kelner-Pillault*) (MNHN, Paris).

Paratypes. **Congo**: 1 ♀, same data as holotype (BMNH); 1 ♀, Dimonika, 'lit. de la rivière à Afio, forêt primitive' (MNHN, Paris).

Belonogaster bimaculata sp. n.

(Figs 49, 50)

FEMALE. Head ferruginous; inner orbits, small spot at sides of clypeus connected to a narrow ventral margin, whitish yellow; a line from eye to eye through the posterior ocelli, produced into a small triangle which includes the median ocellus, black; dorsal side of antennal segments 1–6 darkened. Mesosoma black, pronotum, suffused spot on front of mesopleuron, posterior impression of propodeum, ferruginous. Legs ferruginous, much of fore coxa, mid and hind coxae blackened, mid and hind femora and tibiae somewhat darkened. Gaster with petiole and stalk of segment 2 dark ferruginous, rest of gaster black but tergite 2 with large yellow spots. Wings light fuscous, tips darker, venation brown, length 17.0–19.0 mm.

Clypeus acute below, surface with close large punctures below, reticulate with smaller punctures and sparse tomentum above; frons reticulate with small punctures and a few outstanding pale bristles. Gena (Fig. 49) about three-quarters as wide as eye in profile, surface finely reticulate with quite numerous small punctures below. Base of stipes with many long black hairs. Antennal segment 3 about as long as 4 + 5 + 6, 4 and 5 about 1.25 times as long as broad, 8 quadrate. Mesoscutum and humeri finely granulate, hardly perceptibly punctured with dense appressed silvery tomentum and in front with a few outstanding pale hairs, mesopleuron more distinctly punctured, tomentum less close. Propodeum rather more strongly punctured with slight traces of striae, coarsely reticulate with not very close tomentum and outstanding pale hairs, posterior depression nearly half as long as propodeum, impressed line weak, anterior depression small, transverse. Fore tarsus with segment 4 a little broader and 5 a little shorter than usual. Mid and hind femur with close tomentum and moderately numerous short black and some white bristles beneath, especially on basal half. Hind tibia with some obliquely projecting bristles beneath. Mid and hind tarsi unusually long. Gastral petiole moderately long, distinctly widened posteriorly, spiracles little projecting, with close tomentum and short white hairs; stalk of second tergite 2.0–2.5 times as long as broad, rest of gaster with moderately close pale tomentum but all bristles pale.

MALE. Head ferruginous; inner orbits and sides of clypeus broadly, spot between antennal sockets, greater part of mandibles, whitish yellow; ocellarium and part connecting it to eye blackened. Dorsal side of antenna, especially segments 1–3, darkened. Pronotum and scutellum ferruginous, rest of thorax and propodeum black. Legs ferruginous, apical spot beneath fore coxa, underside of mid coxa, stripe beneath mid femur, pale yellow. Gaster black, tergite 2 with two large round yellow spots. Wings very light fuscous with brown stripe along costa, tips fuscous and venation brown, length 16.5 mm.

Mandibles parallel-sided. Clypeus very little produced below but nevertheless just pointed, surface with long appressed silvery pubescence; frons dull, reticulate with a number of weak punctures and dense tomentum; gena a little more than half as wide as eye in profile, rather dull, finely granulate. Antennal (Fig. 50) segment 3 as long as 4 + 5, 4 and 5 a little more than 2.5 times as long as broad, 8 2.5 times, narrower than 7, segment 2 cylindrical, tip rounded, gently curved, rather more above than below, 11 nearly as long as 12, slightly swollen below, 9 and 10 shorter than 11 and much more swollen beneath, 5–8 with weak raised lines beneath. Mesosoma much as in ♀ but hairs of mesoscutum rather more obvious. Mid and hind femora with tomentum beneath but no bristles. Fore tarsus short, segment 4 about as wide as long, segment 5 in dorsal view about 1.5 times as long as wide. Gastral petiole moderately long, distinctly widened behind, stalk of second gastral tergite 2 as long as broad, gaster with close pale tomentum and a few protruding pale bristles.

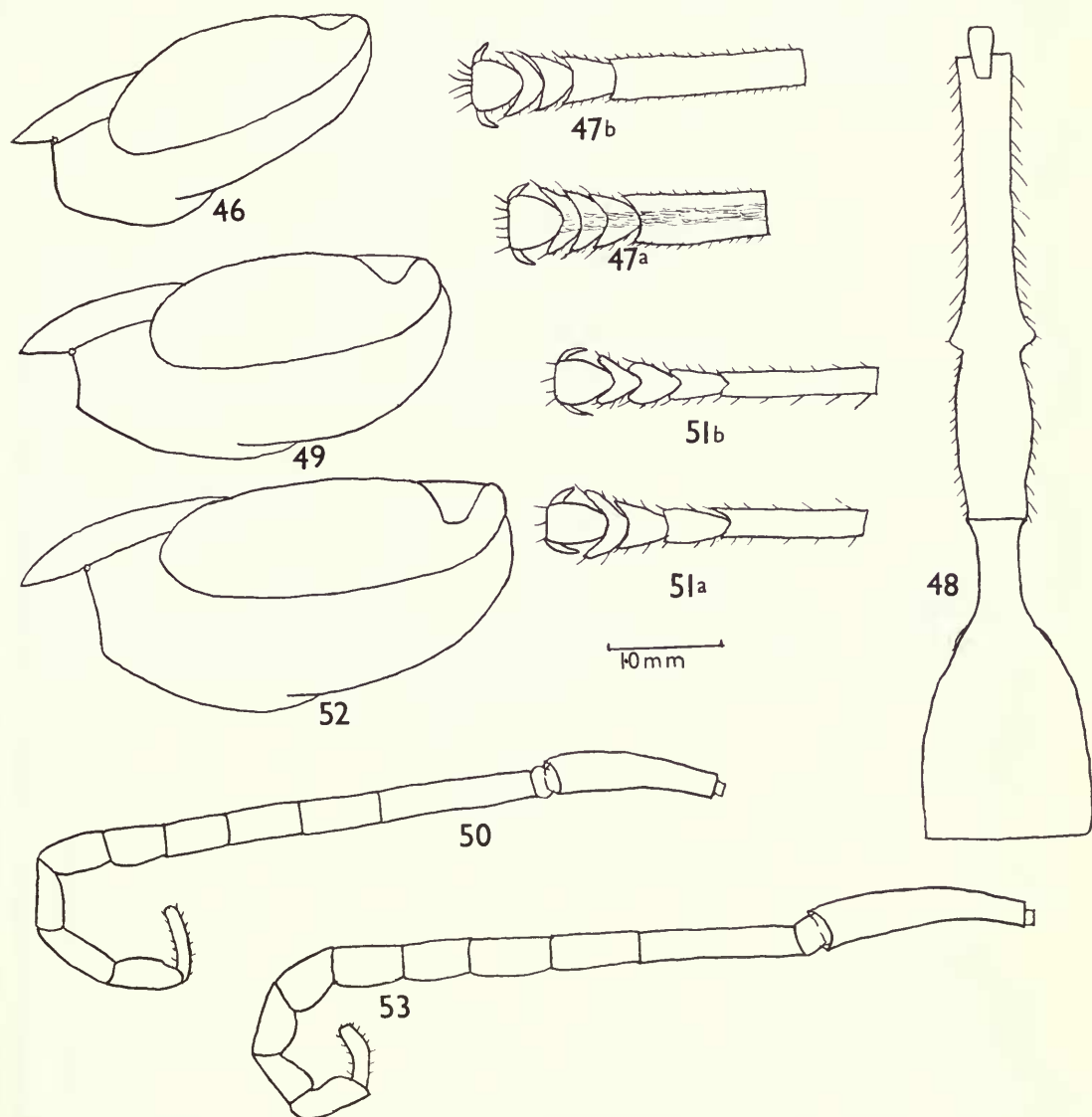
Holotype ♀, **Zambia**: Abercorn, 24.i.1951 (*F. O. Albrecht*) (BMNH).

Paratypes. **Zambia**: 7 ♀, 1 ♂, with same data as holotype but various dates between 12.i. and 13.iv.1951 (BMNH); 3 ♀, Mporokoso, 4500 ft [1370 m], 29.vii.–1.viii.1908 (*S. A. Neave*) (UM, Oxford); 5 ♀, N. Lake Bangweolo, Luwinda, 5.vi.–10.viii.1908 (*S. A. Neave*) (UM, Oxford); 1 ♀, Upper Kalungwisi Valley, 4200 ft [1280 m], 27.vii.1908 (*S. A. Neave*) (UM, Oxford); 1 ♀, near Chinsali, 4300 ft [1310 m], 14.iv.1908 (*S. A.*

Neave) (UM, Oxford); 1 ♀, Middle Chambezi Valley, Chinsali district, 4000 ft [1220 m], 24.iv.1908 (*S. A. Neave*) (UM, Oxford); 6 ♀, High Plateau S. of L. Tanganyika, dense forest, 4500 ft [1370 m], 13.-25.viii.1908 (*S. A. Neave*) (UM, Oxford).

A ♀ caught on 15.ii.1951 at Abercorn had a ♂ strepsipteran puparium beneath the left side of gastral tergite 5.

This species was labelled under the above name by Dr Giordani Soika as a subspecies of *B. facialis*, but no description has been published.



Figs 46-53 *Belonogaster*. 46, 47, *B. fliventris* (de Saussure). (46) ♀, left gena; (47) ♂, fore (a) and mid (b) tarsus. 48, *B. nigricans* sp. n., ♀, gastral tergites 1-2. 49, 50, *B. bimaculata* sp. n. (49) ♀, left gena; (50) ♂, left antenna. 51-53, *B. facialis* du Buysson. (51) ♂, fore (a) and mid (b) tarsus; (52) ♀, left gena; (53) ♂, left antenna.

Belonogaster facialis du Buysson

(Figs 51–53)

Belonogaster facialis du Buysson, 1908: 65; 1909: 238. LECTOTYPE ♀, KENYA: Taita Hills, Bura, 1904 (C. Alluaud) (MNHN, Paris), here designated [examined].

The lectotype is actually labelled 'Afr. orientale anglaise; Boura, Wa-Taita', which I take to be the more southern of the two places in Kenya called Bura. Dr V. G. L. van Someren also collected the species in this locality. The male was not seen by du Buysson.

FEMALE. Head ferruginous; lower half of clypeus and sometimes sides and small dorsal area on malar space, yellow; inner orbits often more or less yellow. Mesosoma and legs ferruginous. Gaster ferruginous, apex of tergites 2–3 and most of tergites 4–6 a little darkened, each of tergites 2–4 with two large round yellow spots. Wings very light ferruginous, costal region darker, tips a little infuscate, length 16.0–19.0 mm.

Clypeus acute below, finely reticulate with scattered moderately large punctures, dorsal three-fifths with close pale tomentum, lower part with a few outstanding pale bristles. Frons with close, rather coarse reticulation and very indistinct small punctures and short outstanding pale hairs. Gena (Fig. 52) a little wider or narrower than eye in profile, finely punctured below. Antennal segment 3 about as long as 4 + 5 + 6, 4 and 5 not or hardly longer than broad, 8 not quite so long as broad. Mesoscutum dull with fine dense reticulation and dense long appressed silvery brown tomentum, no outstanding hairs, punctures very indistinct even on pleuron; scutellum with a weak impressed line, it and metapleuron with punctures a little stronger. Propodeum scarcely punctured with dense appressed silvery brown tomentum and quite dense subappressed hairs on angles, posterior depression one-third as long as propodeum, no impressed line, anterior depression very transverse, hardly developed. Fore coxae normally with black bristles but sometimes with pale ones; mid and hind tibiae with only short pale oblique bristles; mid and hind femora with fine tomentum and a few short pale bristles beneath; last segment of fore tarsus rather shorter than usual. Gastral petiole rather long and narrow, posterior part a little wider, spiracles very little projecting, surface with close, very fine tomentum and a few short outstanding hairs; stalk of second tergite 2.5–3.0 times as long as broad; rest of gaster with close fine silvery brown tomentum and a few obliquely projecting pale bristles.

MALE. Ferruginous; mesosoma and gaster a little darkened; clypeus except a narrow slightly darker central stripe, inner orbits, inner margin of tegula, inner stripe of fore and mid coxae, stripe beneath mid femora and sometimes hind tibia, two roundish spots on each of gastral tergites 2–4, pale yellow. Wings hyaline, tips a little darkened, especially along the costa, length 15.5 mm.

Clypeus obtusely pointed below with moderate silvery pubescence; frons finely reticulate with moderately long outstanding pale hairs; gena a little more than half as wide as eye in profile, a little shining, very finely reticulate. Antenna (Fig. 53) with segment 3 a little longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 a little more than twice as long as broad, 12 cylindrical, tip rounded, well curved with very short hairs, about as long as 6, 10 and 11 rather strongly convex beneath, 4–9 with a shining line beneath. Mesosoma much as in ♀ but tomentum less dense. Fore and mid tarsi (Fig. 51) relatively short and broad, mid tarsus with segment 4 clearly transverse, segment 3 a little longer than broad. Hind femur with dense tomentum and a few white hairs beneath. Gaster as in ♀ but petiole rather less widened posteriorly.

DISTRIBUTION (42 ♀, 3 ♂). Senegal, Congo, Zambia, Kenya, Uganda, Malawi, Mozambique, Tanzania (including Zanzibar), South Africa (Natal).

A male from Tanzania: Mwanza, 18–19.i.1969 (*P. Gillissen, L. Blommers*) (ITZ, Amsterdam) has 2 ♀ strepsipterous puparia under tergite 3 left and tergite 5 right.

Belonogaster pusilloides sp. n.

(Fig. 54)

FEMALE. Head ferruginous; inner orbits below ocular sinus, sides and ventral margin of clypeus, pale yellow; ocellarium slightly darkened or blackish; antenna with dorsal side a little darkened. Mesosoma ferruginous, more or less blackened, especially mesoscutum and mesopleuron. Legs ferruginous, tarsi and mid and hind tibiae blackish, fifth tarsal segment red. Gaster black, segments 1–2 red. Wings brown, tips not darker, length 14.0–16.0 mm.

Clypeus acute below, finely reticulate with a few scattered punctures on lower half bearing fine black bristles. Frons dull, scarcely punctured with a few sparse outstanding black bristles. Gena nearly as broad as

eye in profile, finely reticulate, somewhat shining below with scattered fine punctures. Antenna with segment 3 about as long as 4 + 5 + 6, 4 and 5 slightly longer than broad, 8 slightly shorter. Thorax finely granulate, dull, not punctured, with close fine greyish white tomentum, pleuron with feeble punctures and similar tomentum. Propodeum feebly punctured with silvery tomentum and rather short outstanding pale hairs, posterior depression rather less than half as long as propodeum, impressed line distinct, anterior depression very small, transverse. Fore coxa with black hairs. Hind femur beneath with silvery pubescence and short oblique black bristles for its whole length; hind tibia with some oblique black bristles beneath; fore tarsus rather broad but fifth segment long (Fig. 54). Gastral petiole rather long and narrow, a little wider distally, spiracle little projecting, with fine tomentum and very few hairs; stalks of second gastral tergite 2.5 times as long as broad, gaster posteriorly with dense silvery tomentum and a few outstanding pale bristles.

MALE. Ferruginous; face below centre of ocular sinus (except a rather narrow brown central stripe), dorsal half of mandibles, antennal segments 1–2 and small spot beneath base of 3, light yellow. Antenna brown above (scape almost black), tip paler ferruginous; ocellarium black. Mesosoma ferruginous; mesoscutum black except sides opposite tegula. Legs ferruginous, mid and hind tibiae a little darker, tarsi black or blackish brown. Gaster ferruginous. wings rather dark red-brown, tips not darker, length 18.0 mm.

Clypeus below obtusely produced, regularly curved, projecting distinctly beyond lateral lobes, surface slightly shining, very finely reticulate with scattered large punctures bearing rather short fine black bristles, almost no tomentum. Frons dull, reticulate with numerous small punctures and outstanding black bristles. Gena about half as wide as eye in profile. Antenna with segment 3 about as long as 4 + 5, 4 and 5 2.5 times or rather more as long as broad, 8 rather more than twice as long as broad, 12 flattened, straight below, curved above, tip rounded truncate, practically no hairs, 10 with a slight rounded hump beneath, 11 cylindrical, 4–9 with a raised line beneath. Mesoscutum with moderately coarse rather sparse punctures, not very close tomentum, scattered rather short fine hairs, humeri rather less punctured with longer hairs, pleuron finely reticulate, closely punctured, very little tomentum; scutellum with no central line, it and metanotum confluent punctured. Propodeum coarsely punctate striate with long fine dark hairs which are not very dense, posterior depression rather less than half as long as propodeum, impressed line rather strong, anterior depression deep, rather large. Fore tarsus with last segment elongate. Fore and mid femur with short white pile beneath, hind femur with fine white tomentum and a few very short bristles. Gaster much as in female.

Holotype ♀, **Uganda**: top of escarpment, east of Batiaba, L. Albert, 3200 ft [980 m], 9–10.xii.1911 (*S. A. Neave*) (BMNH).

Paratypes. **Uganda**: 1 ♀, eastern Mbale district, S. of Mt Elgon, 3700–3900 ft [1130–1190 m], 2–5.viii.1911 (*S. A. Neave*); 2 ♀, Mbale-Kuni Rd, 3700 ft [1130 m], S. of L. Salisbury, 15–17.viii.1911 (*S. A. Neave*) (BMNH). **Kenya**: 1 ♀, Kisii district, S. of Kavirondo, 5000 ft [1520 m], 9–12.v.1911 (*S. A. Neave*); 1 ♂, Mgorr R., 1912 (*Capt. A. O. Luckman*); 1 ♀, Trans-Nzoia district, near Cherangani Hills, 40 miles [64 km] east of Mt Elgon, 6200 ft [1890 m], 3–5.ii.1925 (*C. R. S. Pitman*) (BMNH); 1 ♀, Kisumu, Victoria-Nyansa, 1904 (*Ch. Alluaud*) (MNHN, Paris). **Congo**: 1 ♀, bought from Deyrolle (MNHN, Paris). **South Africa**: 1 ♀, Natal, Lake St Lucia, False Bay, 13–17.ii.1967 (*D. Gillissen, L. Blommers*) (ITZ, Amsterdam).

Belonogaster macilenta (F.)

(Figs 55–57)

Vespa macilenta Fabricius, 1781: 468. Holotype ♂, AFRICA AEQUINOCTIALI (BMNH, Banks coll.) [examined].

Belonogaster macilentus (Fabricius) Smith, 1857: 94.

Belonogaster pusillus Kohl, 1894: 320, 323, 325, pl. 15, figs 75, 77, pl. 16, fig. 116. Syntypes 3 ♂, 1 ♀, SIERRA LEONE (*Moquerys*) (IRSNB, Brussels, not found). **Syn. n.**

Fabricius' type is in bad condition. Antennal segment 12 is missing but segments 1–11 are present on the left. One set of legs is present on the left. The gaster is missing after segment 3. The antenna except the scape is not blackened above but the yellow spot on the second gastral tergite is characteristic. There is a narrow, narrowly interrupted yellow band with a dark dot in it on each side. This is a development of the more usual transverse comma-like mark with the tail of the comma spirally rolled so as to enclose a spot.

Kohl's description and figures allow his species to be identified in the absence of the type.

FEMALE. Ferruginous, vertex, mesoscutum, bases of gastral tergites 3–4 a little blackened; mid and hind tarsi black but segment 5 ferruginous. Dorsal half of mandibles, sides of clypeus, sometimes spot on malar space,

inner orbits, centre of pronotal collar and a narrow hind margin, inner margin of tegula, basicostal plate, axillae, front margin of scutellum, metanotum, valves and upper part of posterior depression of propodeum, ventral part of front margin of pronotum, posterior points of mesosternum and spot at mid coxal articulation, inner stripes on propleuron, stripes on fore and mid coxae, transverse comma-shaped mark on gastral tergite 2, preapical band on tergite 3, some or all whitish yellow. Wings pale yellow-brown, length 14.0–17.5 mm.

Clypeus acute below, finely granulate, lower part more shining with a moderate number of large punctures and oblique black bristles. Frons dull, granulate with a few outstanding white hairs. Gena (Fig. 55) nearly as wide as eye in profile, fine reticulate with quite numerous small punctures below. Antennal segment 3 nearly as long as 4 + 5 + 6, 4 and 5 as long or rather longer than 1.5 times as long as broad, 8 a little longer than broad. Mesoscutum dull, granulate with some small, indistinct punctures, tomentum appressed, strong and silvery; mesopleuron similar but punctures stronger; scutellum with an impressed line, it and metanotum granulate. Propodeum granulate, angles weakly punctate-striate, moderately numerous outstanding white hairs, posterior depression strong, one-third as long as propodeum, impressed line strong, anterior depression small but deep. Fifth segment of fore tarsus elongate; hind femora beneath with fine, not very dense tomentum and a few pale bristles. Gastral petiole moderately thick, a little widened at apex, with rather sparse tomentum but many white hairs beneath, spiracles little protruding; stalk of second gastral tergite about 3 times as long as broad, gaster with dense silvery tomentum with a few projecting pale bristles.

MALE. Head ferruginous, dorsal part of frons blackish; dorsal edge of mandible, sides of clypeus, inner orbits, white; antenna more or less blackish above, ferruginous below, segments 10–11 ferruginous. Mesosoma ferruginous, hind margin of pronotum, mesoscutum, blackish. Legs ferruginous, fore tarsus except segment 5 blackish, mid and hind tarsi black with segment 5 ferruginous. Gaster with segments 1–2 ferruginous, apex of 2 blackish with two transverse white comma-shaped spots, segments 3–4 black, 5–7 dark ferruginous. Wings yellow-brown, tips hardly darker, length 14.0–15.5 mm.

Clypeus (Fig. 57) ventrally very obtusely rounded, dull, granulate with silvery hairs, especially at sides. Frons dull, granulate with some outstanding pale hairs. Gena half as wide as eye in profile or rather less, finely reticulate with a few punctures below. Antenna (Fig. 56) with segment 3 about as long as 4 + 5, 4 and 5 about 2.5 times as long as broad or rather less, 8 rather less than 1.5 times as long as broad, 12 black above, pale ferruginous below without hairs, much flattened, oval but somewhat longitudinally curved, tip rounded, as long as 11, 8–11 somewhat convex beneath, 3–7 with a raised line beneath. Mesosoma granulate, unpunctured with close appressed silvery tomentum. Propodeum with some weak striae on sides below, moderately numerous black outstanding hairs, posterior depression one-quarter as long as propodeum, impressed line strong, anterior depression very small. Fore and mid tarsi very slightly widened, hind femora with pale tomentum and some short brown bristles beneath. Gastral petiole slender, not widened posteriorly, spiracles rather prominent, with close tomentum and some short hairs beneath. Stalk of second gastral tergite about 3 times as long as broad, gaster posteriorly with dense silvery tomentum but no protruding bristles.

DISTRIBUTION (35 ♀, 24 ♂). **Guinea-Bissau, Sierra Leone, Liberia, Ivory Coast, Ghana, Nigeria.**

Belonogaster principalis sp. n.

FEMALE. Ferruginous; hind tarsi, apex of gastral tergite 2, tergites 3–4, a little darkened; tergite 2 with two large preapical transverse yellow spots. Wings light ferruginous, a little darker along the costa, tips if anything paler, length 18.0 mm.

Clypeus acute below, finely reticulate with scattered large punctures, lower half a little more shining with a moderate number of brown or blackish not very long bristles, dorsal third with fine whitish tomentum. Frons finely reticulate with close moderately large punctures, it and occiput with moderately long, outstanding fine black bristles and sparse pale tomentum. Gena about as wide as eye in profile, shining, very finely reticulate with scattered small punctures. Antennal segment 3 very little shorter than 4 + 5 + 6, 4 and 5 very little longer than broad, 8 quadrate. Whole thorax with rather numerous rather fine punctures, with sparse, very fine, whitish tomentum and numerous short outstanding hairs which are black dorsally and pale on sides. Scutellum with no central line. Propodeum with close larger punctures, more or less punctate-striate on angles with close pale tomentum and numerous moderately long outstanding black hairs, posterior depression about one-third as long as propodeum, sides strongly raised, impressed line moderately strong to mid-point, anterior depression small, transverse, only centrally deep. Fore tarsus with fifth segment elongate; mid and hind femora with fairly numerous outstanding black hairs and very fine pale tomentum beneath; mid and hind tibiae with fairly numerous short black oblique bristles. Fore coxa with long black

hairs beneath, mid and hind coxae with short pale hairs. Gastral petiole rather long and narrow, shining with very little tomentum but quite numerous pale outstanding hairs, apex a little broader than base, spiracles strongly protruding; stalk of second gastral tergite about 3 times as long as broad; gaster posteriorly with rather dense pale tomentum and a few outstanding pale bristles.

MALE. Not seen.

Holotype ♀, **Guinea-Bissau**: Príncipe I., between Roca Esperanza and Roca Sundi, 22.ix.1949 (G. R. Gradwell & D. Snow) (BMNH).

Belonogaster jordani sp. n.

FEMALE. Head dark ferruginous, frons somewhat blackened, antennae ferruginous. Mesosoma entirely dull, coal-black. Legs black, tibiae and tarsi light ferruginous, tarsi dark annulated. Gaster black, segments 1-2 and 5-6 red, 2 with two small round yellow spots. Wings brown, tips darker, length 16.0 mm.

Clypeus acute below, dull, finely reticulate with quite close large punctures over most of the surface with stout oblique black bristles. Frons dull with very weak punctures and rather long outstanding black hairs and little tomentum. Gena about as wide as eye in profile, finely reticulate with weak, fine but quite numerous punctures. Base of stipes and prementum with a number of rather short brown bristles. Antennal segment 3 about as long as 4 + 5 + 6, 4 and 5 slightly longer than broad, 8 quadrate. Mesoscutum and humeri dull, coarsely reticulate with numerous rather weak punctures, not very close greyish tomentum and outstanding moderately long black hairs. Mesopleuron similar but punctures rather more distinct. Scutellum with no central line. Propodeum rather more shining, punctate-striate with dense long black hairs, posterior depression one-third as long as propodeum, impressed line strong, anterior depression small, very transverse, deep. Fore tarsus with fifth segment elongate. Mid and hind femur with numerous moderately long black bristles beneath. Gastral petiole moderately long, narrow, very little widened posteriorly, spiracles strongly protruding; stalk of second gastral tergite 2.5 times as long as broad; gaster posteriorly with moderately dense greyish tomentum with a few outstanding black bristles.

MALE. Not seen.

Holotype ♀, **Angola**: Quirimbo, v.1934 (K. Jordan) (BMNH).

I have seen two forms which are close to this species but apparently not quite the same. (1) ?Kenya: 2 ♀, Ukambani coast, xi-xii.1888 (F. J. Jackson) (BMNH). Larger, wing length 22.0 mm. Mesosoma less black, humeri more distinctly punctured. Legs more red; yellow spot of gastral tergite 2 larger, comma-shaped. (2) Mozambique 1 ♀, 'bassin inférieur du Zambèze, vallée du Muza', 32°E, 18°S (Grassé) (MNHN, Paris), placed under *B. filiventris*.

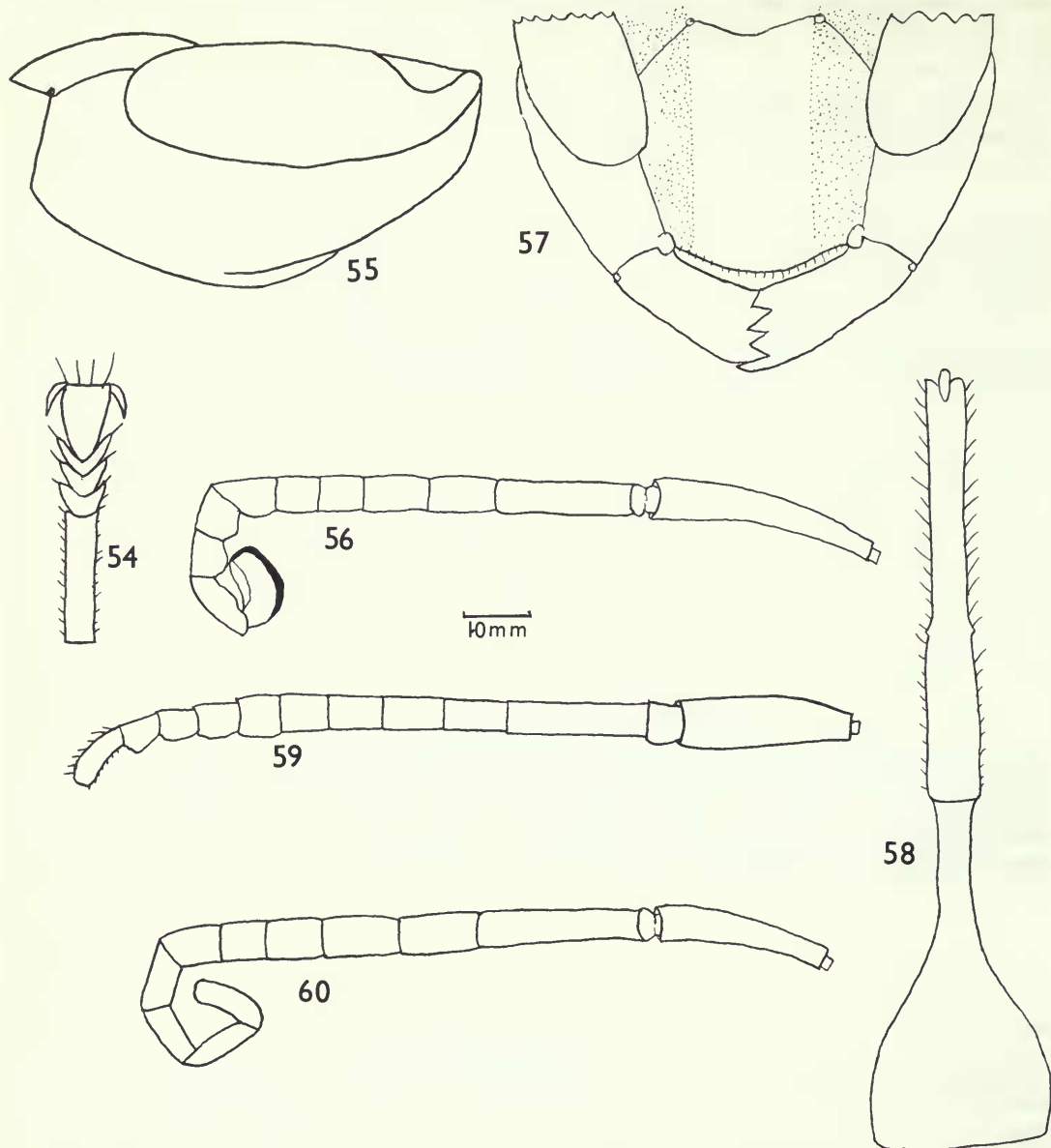
Belonogaster punctilla sp. n.

FEMALE. Head ferruginous; area between antennal sockets, frons and vertex, greater part of gena and head beneath, black; antenna except segments 1-2, black. Mesosoma and legs black. Gaster black, segment 1 and stalk of segment 2 dark ferruginous. Wings blackish brown with slight purplish reflections, length 16.5 mm.

Clypeus strongly acute below, very finely reticulate with scattered large punctures; frons with close, moderately strong punctures and outstanding black bristles, very little tomentum; gena about two-thirds as wide as eye in profile, very finely reticulate with numerous punctures. Antennal segment 3 as long as 4 + 5 + 6, 4 and 5 a little longer than broad, 8 not quite as long as broad. Mesoscutum and humeri with numerous deep, quite large punctures, finely granulate but surface much hidden by close silvery tomentum, no outstanding hairs or bristles; mesopleuron with sparser, rather finer punctures, tomentum similar. Scutellum and metanotum closely and coarsely punctured. Propodeum coarsely, not very closely punctured, angles and posterior surface strongly striate with silvery tomentum and short sparse outstanding black bristles; posterior depression not quite half as long as propodeum, impressed line very weak, anterior depression small but deep. Fifth segment of fore tarsi rather short, other tarsi elongate; mid and hind femora with short not very close black and white bristles beneath on proximal part. Gastral petiole moderately long and narrow, a little wider distally, numerous hairs beneath, spiracles not protruding; stalk of second gastral sternite 2.5 times as long as broad; gaster posteriorly with close silvery tomentum and some projecting silvery bristles.

MALE. Not seen.

Holotype ♀, Uganda: Mpanga forest, Toro, 4800 ft [1460 m], 13–23.xi.1911 (S. A. Neave) (BMNH).
Paratype. 1 ♀ with same data.



Figs 54–60 *Belonogaster*. 54, *B. pusilloides* sp. n., ♀, fore tarsus. 55–57, *B. macilenta* (F.). (55) ♀, left gena; (56) ♂, left antenna; (57) ♂, clypeus. 58, *B. punctata* sp. n., ♂, gastral tergites 1–2. 59, *B. rothkirchi* von Schulthess, ♂, left antenna. 60, *B. leonhardii* du Buysson, ♂, left antenna.

Belonogaster punctata sp. n.

MALE. Head ferruginous; frons, vertex and underside black; antennae black above except segments 10–12; spot between antennal sockets, inner orbits to near top of sinus, broad sides of clypeus, mandibles, creamy white. Mesosoma black, ventral corner of pronotum, margins of scutellum and metanotum, mesosternum, bottom of metapleuron, most of propodeum, light ferruginous. Legs ferruginous, four hind tibiae and all

tarsi black; fore and mid coxa beneath, anterior stripes on all femora, yellow. Petiole and stalk of second gastral tergite ferruginous, petiole above darker distally, tergite 2 blackish ferruginous, rest of gaster black, sternites ferruginous suffused. Wings brownish, venation red-brown, length 19.5 mm.

Clypeus only a little produced below to just beyond the lateral lobes, tip just rounded, sides of clypeus with quite dense silvery tomentum, whole surface with scattered punctures and outstanding black bristles. Frons rather strongly punctured with a central patch of silvery tomentum and dense rather long black bristles. Gena half as wide as eye, finely reticulate with some large punctures below. Antenna with segment 3 a little longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 about 2.25 times as long as broad, 12 distinctly flattened, ventral side straight, dorsal side a little curved, end rounded truncate, a little darkened, not quite as long as 11, 9–11 with slight raised lines beneath but real prominences, 5–8 with slight raised lines beneath. Mesoscutum and humeri with close coarse punctures and dense hair-like silvery tomentum; mesopleuron with close coarse punctures but sparser tomentum; scutellum and metanotum closely punctured. Propodeum with sides coarsely punctured, angles and posterior surface coarsely striate with long, outstanding silvery hairs, posterior depression one-quarter as long as propodeum, impressed line strong, anterior depression small and shallow. Last segment of fore tarsus elongate; mid and hind femora with rather long outstanding white and black bristles, especially near base. Gastral petiole (Fig. 58) long and narrow, a little widened posteriorly, with many long hairs, spiracles scarcely protruding; stalk of second gastral tergite 4.5 times as long as broad, rest of gaster with dense fine silvery brown tomentum and some silvery bristles.

FEMALE. Not seen.

Holotype ♂, Cameroun: Kumba, 7.x.1949 (*H. Oldroyd*) (BMNH).

This species is very like the preceding one, but the stalk of the second gastral tergite is very much longer and the localities are far apart.

Belonogaster rothkirchi von Schulthess

(Fig. 59)

Belonogaster rothkirchi von Schulthess, 1914: 4. LECTOTYPE ♂, CAMEROUN: Kamerunberg, Soppo, xi.1912 (*von Rothkirch*) (EI, Zürich), here designated [examined].

MALE. Ferruginous, legs and gastral segments 2–7 a little darkened. Mandibles, clypeus, inner orbits above, streak beneath scape, apparently streaks on femora, two large suboval almost contiguous spots on gastral tergite 2, yellow. Wings hyaline, venation ferruginous, length 17.0 mm.

Mandibles almost parallel-sided, little widened to apex, shining. Clypeus very obtuse-angularly projecting below, tip just rounded, slightly convex, especially transversely, with scattered fine punctures bearing fine black bristles, dense outstanding silvery hairs in a broad band on each side. Frons dull, finely reticulate with rather sparse moderate-sized punctures and outstanding black bristles which are also on the vertex, and dense long silvery tomentum. Gena rather less than half as wide as eye in profile with dense silvery, hair-like tomentum. Antenna (Fig. 59) with segment 3 a little longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 rather less than twice as long as broad, segment 12 distinctly flattened, gently curved, rather more so above, tip rounded, a row of minute hairs on dorsal side, segment about as long as 7, 11 a little longer than 8, 9–10 a little shorter, 8–11 with a strongly protruding keel beneath, 6–7 with weak keels. Humeri and mesoscutum moderately shining, feebly granulate with no distinct punctures, not very dense hair-like silvery tomentum and some longer black hairs; scutellum with no central line, it and metapleuron like mesoscutum; mesopleuron rather shining, finely reticulate with some fine punctures; propodeum hardly punctured but with distinct striae, especially posteriorly, moderately shining with outstanding black hairs and silvery brownish tomentum; posterior depression one-third as long as propodeum, impressed line weak to mid-point, anterior depression very weak. Last segment of fore tarsus a little shortened. Mid and hind femora with moderately dense tomentum beneath and some short black bristles, especially near base. Gastral petiole moderately long, thin to the moderately projecting spiracles, beyond them distinctly widened; stalk of second tergite 4.5 times as long as broad; posterior tergites with fine, not very dense brown tomentum, no protruding bristles.

FEMALE. Not seen.

DISTRIBUTION. Cameroun: only the lectotype ♂ and paralectotype ♂ are known.

Belonogaster libera sp. n.

MALE. Head dark ferruginous, dorsally darker (almost black); mandibles white with pitchy margins; clypeus white with a broad central brown stripe; antennal segments 1–7 blackish above, ferruginous beneath, 8–11 gradually rather paler, 12 with distal three-quarters shining black. Mesosoma blackish, legs dark ferruginous. Gaster with segments 1–2 ferruginous, 3 blackish, 4–6 dark ferruginous, 7 pale ferruginous. Gastral tergite 2 with two large subtriangular pale yellow spots, almost meeting along mid line, tergite 3 with two narrow transverse yellow spots. Wings brown, length 15.0 mm.

Mandibles parallel-sided, 4 apical teeth, dorsal one very short. Clypeus very little produced beneath, gently rounded from side to side, surface feebly transversely convex, hardly depressed at apex, with dense rather long white hairs, surface dull, finely granulate. Frons dull, not punctured, finely granulate with a few outstanding black hairs. Gena two-thirds as wide as eye in profile, antenna with segments 2 + 3 as long as scape, 3 thin, very elongate, a little longer than 4 + 5, 4 and 5 2.5 times as long as broad, 8 rather more than 1.5 times, 11 long, narrow cylindrical, about as long as 5, 12 long oval, slightly flattened, apex narrowly rounded, 8–10 with raised flattened low projections beneath, 6–7 with feeble lines beneath. Thorax dull, weakly granulate, not punctured with dense grey tomentum; propodeum dull, granulate with dense silvery grey hairs and some upright hairs at sides, posterior depression about one-quarter as long as propodeum, impressed line strong, almost complete, anterior depression small, indistinct. Last segment of fore tarsus hardly shortened, fore and mid tarsi not widened; hind femur with pale tomentum but no bristles beneath. Gastral petiole long and slender, little widened behind, spiracles strongly projecting, moderately shining, hairs short and moderately dense; stalk of second tergite 4 times as long as broad; gaster posteriorly with dense silvery pubescence and some fine black hairs.

FEMALE. Not seen.

Holotype ♂, Liberia: Robertsport, iii.1890 (*A. F. Derner*) (RNH, Leiden).

Belonogaster fuscipennis du Buysson stat. n.

Belonogaster griseus (F.) var. *fuscipennis* du Buysson, 1909: 251, 264. LECTOTYPE ♀, Congo: Haute Sangha, 1900 (*P. A. Ferrière*) (MNHN, Paris), here designated [examined].

The series of wasps in MNHN, Paris under the name *griseus* var. *fuscipennis* included in my opinion five distinct species—the one described below, *B. pennata*, a species near *B. saeva*, a rather dark-winged form of *B. grisea* and *B. juncea colonialis*. None of the specimens was labelled type so I designate one of four females labelled with the variety name *fuscipennis* by du Buysson and coming from Haute Sangha, 1900 (*P. A. Ferrière*). This is the first locality given in the description.

FEMALE. Head including antennae ferruginous. Mesosoma ferruginous, mesoscutum, humeri, most of pleuron, dorsal part of propodeum more or less darkened. Legs ferruginous, mid and hind tibiae somewhat darkened, tarsi also rather darker, but last segment usually red. Gaster black, petiole and basal part of tergite 2 ferruginous, tergite 2 with two large irregularly triangular yellow spots, sternite 2 with two subapical yellow dots. Forewings dark fuscous with purplish reflections, venation very dark red-brown, hind wings paler, length 17.0–23.5 mm.

Clypeus acute below, with scattered large punctures on lower third, upper part very finely granulate with sparse pale tomentum and few punctures; frons dull, finely reticulate with some rather fine punctures and not very close outstanding pale bristles; gena not quite as wide as eye in profile, finely reticulate but rather shining below with numerous small punctures; antennal segment 3 about as long as 4 + 5 + 6, 4 and 5 less than 1.5 times as long as broad, 8 quadrate. Mesoscutum finely granulate with indistinct punctures, mainly at sides, with not very dense silvery tomentum, humeri very similar but with less tomentum except on hind margin and punctures rather more obvious; mesopleuron with punctures stronger, tomentum sparser; propodeum granulate and tomentose with rather strong punctures, more punctate-striate on angles with sparse outstanding dark hairs, posterior depression half as long as propodeum, impression strong but only within the depression, anterior depression small but deep. Last segment of fore tarsus elongate, hind femur with white tomentum beneath and a few short outstanding pale bristles. Gastral petiole rather long and narrow, little widened posteriorly, with sparse tomentum and short outstanding bristles, spiracles little projecting; stalk of second gastral tergite 2.0–2.5 times as long as broad, usually nearer 2.5, gaster posteriorly with moderately close pale tomentum and some obliquely projecting pale bristles.

MALE. Not seen.

DISTRIBUTION. Congo: lectotype ♂, 3 ♀ (paralectotypes), Haute Sangha, 1900 (*P. A. Ferrière*) (MNHN, Paris); 1 ♀, same place and collector, 1897 (MNHN, Paris). Sudan: 9 ♀, Kordofan, Nuba Mts, Beiban, i.1922 (*Capt. F. Moysey*) (BMNH); 1 ♀, Kordofan, Talodi, xii.1967 (*J. Cloudsley-Thompson*) (BMNH); 1 ♀, Darfur, Niurnnya, 13.ii.1921; 5 ♀, 28.ii.1921 (*Admiral H. Hynes*) (BMNH); 4 ♀, El Fasher, 8000 ft [2440 m], 22.iii., 6.iv., 9.iv., 16.iv. (*H. Hynes*) (BMNH); 2 ♀, W. Darfur, Jebel Murra, Karanga, 6600 ft [2010 m], 20.iv.1932; 4 ♀, 18.iv.1932 (*Miss M. Steele*) (BMNH); 6 ♀, Jebel Murra, Derita Lakes, 8000 ft [2440 m], 27.iv.1932 (*Miss M. Steele*) (BMNH).

Belonogaster leonhardii du Buysson

(Figs 60, 61)

Belonogaster leonhardii du Buysson, 1909: 252. Holotype ♀, UGANDA: Iraouer, 1909 (*von Leonhardi & L. V. Heyden*) (MNHN, Paris) [examined].

Belonogaster leonhardi: Benoit, 1956: 553. [Mis-spelling.]

FEMALE. Head ferruginous, mandibles, dorsal triangular area on clypeus, subantennal area, frons, vertex and antennae, top of gena, much of head beneath, black. Mesosoma, legs, black. Gaster black, petiole and base of stalk of second gastral tergite, ferruginous. Wings grey, costal region browner, length 16.5–21.5 mm.

Clypeus acute below, very finely reticulate, lower half more shining with many large punctures which are closer on upper half, many short black suberect bristles, dorsal half with close silvery tomentum. Frons closely punctured with many outstanding black bristles and close silvery tomentum. Gena as wide as eye in profile, finely reticulate with many small punctures and dorsally with hairs. Base of submentum and stipes with a tuft of fine hairs. Antenna with segment 3 distinctly longer than 4 + 5, 4 and 5 about 1.5 times as long as broad, 8 a little longer than broad. Mesoscutum and humeri with dense brassy tomentum hiding the surface, a number of fine punctures indicated by fine black outstanding hairs; mesopleuron, scutellum and metanotum similar, scutellum anteriorly with a small, raised central line. Propodeum with dense brassy tomentum with fine punctures where mainly pale hairs arise, posterior depression one-third as long as propodeum, impressed line to mid point, anterior depression small but deep. Last segment of fore tarsi hardly shortened; femora beneath with fine tomentum but no bristles. Gastral petiole stout, rather short, regularly widened to apex, spiracles not projecting, hairs short; stalk of second gastral tergite 2.5 times as long as broad, thyridium on each side of posterior end of stalk large and deep; posterior part of gaster with dense brassy tomentum concealing the surface.

MALE. Black; upper two-thirds of mandibles, clypeus and lower face except a narrow central stripe, spot between antennal sockets, scape beneath, yellow; anterior spot at base of hind femora anteriorly, yellow. Gastral petiole dark ferruginous. Wings brown, tips darker, length 21.0 mm.

Mesosoma, gaster except petiole and stalk of gastral tergite 2, with dense brassy tomentum. Clypeus (Fig. 61) moderately angularly produced below, shining with scattered punctures bearing black bristles, very little tomentum. Frons with moderately numerous medium-sized punctures and outstanding black hairs. Gena half as wide as eye in profile. Antennal (Fig. 60) segment 3 as long as 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 rather less than twice as long as broad, 12 a little flattened, underside straight, upperside moderately curved, end rounded, about as long as 11, 10 and 11 not appreciably convex beneath, 4–11 with a weak raised line beneath. Mesoscutum with a few punctures, nearly hidden by tomentum, mesopleuron slightly more clearly punctate; propodeum punctate-striate but sculpture nearly hidden by the tomentum, with numerous outstanding black hairs, depressions as in ♀. Last segment of fore tarsi hardly shortened; hind femur beneath with tomentum and a few fine bristles. Gastral petiole as in ♀, stalk of second gastral tergite about 1.5 times as long as broad.

DISTRIBUTION (19 ♀, 2 ♂). Uganda (on slopes of Mt Ruwenzori, 4000–8000 ft [1220–2440 m]), Burundi (Benoit, 1956: 552), Zaire (Benoit, 1956: 552).

There is a ♀ specimen in the BMNH labelled 'Tanganyika T., Bukavu, 19.vii.31 (*J. Ogilvie*)' but Bukavu is in Zaire.

Belonogaster grisea (F.)

(Fig. 62)

Vespa grisea Fabricius, 1775: 372. Holotype ♀, SIERRA LEONE (BMNH, Banks coll.) [examined].

[? *Raphigaster rufipennis* (Degeer); de Saussure, 1853: 15, pl. 2, fig. 6. Misidentification.]

[? *Belonogaster fulvipennis*: de Saussure, 1891: fig. 1. Mis-spelling of *rufipennis*. Misidentification.]

- Belonogaster pictus* Kohl, 1894: 320, 323, 324, pl. 16, fig. 118. LECTOTYPE ♀, CAMEROUN: 25.iii.1892 (NM, Vienna), here designated [examined].
- ? *Belonogaster braunsii* Kohl, 1894: 331. Syntype(s) ♀, SOUTH AFRICA: Durban (Port Natal) (depository unknown).
- Belonogaster griseus* var. *pallens* du Buysson, 1909: 250, 265. LECTOTYPE ♀, CONGO: Libreville, 1909 (C. Chalot) (MNHN, Paris), here designated [examined].
- ? *Belonogaster erythrospilus* Cameron, 1910: 172. LECTOTYPE ♀, TANZANIA: Meru, 25.xi.1905 (Y. Sjöstedt) (NR, Stockholm), here designated [examined].

There are 2 ♀ labelled *B. pictus* by Kohl in NM, Vienna; I have labelled one from Cameroun as lectotype. I have not been able to find a specimen labelled *B. braunsii* Kohl in NM, Vienna or elsewhere. Under the name *B. griseus* var. *pallens* de Buysson in MNHN, Paris is a long series of wasps belonging to *B. brunnescens* and to a rather pale form of *B. grisea*. One of the latter from Congo: Libreville is here designated the lectotype. The position of *B. erythrospilus* is still uncertain. There are two syntypes ♂ ♀ in NR, Stockholm and 2 ♀ syntypes in BMNH. The male from Tanzania: Meru is here made lectotype and the form is discussed below. The species *grisea* as a whole is very variable and it is likely that studies of populations in the field will recognize further taxa.

I have seen 4 specimens of *B. erythrospilus*, the ♂ lectotype and three females (one RM, Stockholm, two BMNH). They all come from approximately the same place:— Tanzania: Meru, lower region, Ngare na nyuki, xii., i., ii. They also look very similar.

The male has the antenna very similar to that of *B. grisea* but rather shorter. The clypeus is somewhat less acute below and there are no pale stripes at the sides. The ocellarium is black. There seem to be a few outstanding hairs on the humeri and mesoscutum and there are many short, black outstanding hairs on the propodeum. The stalk of the second gastral tergite is about 1.5 times as long as broad and there seem to be a few black bristles protruding on the posterior tergites, though it is difficult to be sure in a dirty specimen. The females are very like some specimens of *B. grisea* but the propodeum has quite numerous outstanding dark brown hairs. The stalk of the second gastral tergite is about twice as long as broad. The specimens are on the small side, wing-length 18.0–20.0 mm.

It seems best at the moment to treat these as a form of *B. grisea*.

FEMALE. Head ferruginous, ocellarium and dorsal side of antenna often more or less darkened. Mesosoma ferruginous, humeri and mesoscutum usually more or less darkened, posterior half of mesopleuron often somewhat darkened. Legs ferruginous, tibiae and less often the femora often more or less darkened, tarsi usually blackish. Gaster blackish, petiole and anterior half of tergite 2 more or less ferruginous. Ventral quarter of clypeus rarely a little yellow-tinged. Second, third and fourth gastral tergites sometimes with a pair of yellow spots, especially in West African specimens (like the holotype); in 330 females, 11.8% had 6 spots, 1.5% 4, 21.5% 2 and 65.2% none. Gastral sternite 2 also sometimes with two small yellow spots. Wings almost hyaline to light brownish or even exceptionally dark brown with tips more or less distinctly darkened, length 15.5–25.5 mm, usually 18.0–22.0 mm.

Clypeus acute below, with sparse relatively large punctures and a few outstanding black bristles, dorsal part with dense white tomentum; frons with not very close small punctures and short outstanding white and black hairs and silvery tomentum; gena rather more than half as wide as eye in profile, very finely reticulate with numerous small punctures, especially below; base of submentum and stipes with very few bristles; antennal segment 3 distinctly longer than 4 + 5, 4 and 5 just longer than broad, 8 about quadrate. Humeri and sides of mesoscutum with small inconspicuous punctures almost hidden by the dense appressed silvery tomentum, scutellum and metanotum more strongly punctured, the former with weak central impressed line; punctures of mesopleuron distinct and not hidden by the tomentum; propodeum punctate-striate with dense appressed silvery hairs and some short pale outstanding hairs, posterior depression rather less than half as long as propodeum, impressed line rather weak, anterior depression small but deep. Last segment of fore tarsus elongate; hind femora with white tomentum beneath and sometimes a few short black or white bristles. Gaster with petiole relatively long and narrow, a little widened posteriorly, spiracles little projecting, surface with a little white tomentum and some short outstanding bristles; second gastral tergite with the stalk 1.5–3.5 times as long as wide, usually 2.5–3.0 times, gaster posteriorly with close silvery tomentum and no protruding black bristles or a very few at extreme sides.

MALE. Head ferruginous, ocellarium hardly darkened, antennal segments 1–7 darkened above. Dorsal half of mandibles, sides of clypeus, inner orbits, sometimes spot between antennal sockets, creamy white; scape

beneath yellow. Mesosoma ferruginous, mesoscutum usually blackish, legs ferruginous, fore femur sometimes with a yellow stripe beneath, tibiae and tarsi more or less blackened. Gaster black, petiole, stalk and some of the anterior part of tergite 2, ferruginous, tergites 2-4 sometimes each with two yellow spots, especially in West Africa (proportions with 0, 2, 4 and 6 spots much as in ♀). Wings more or less brownish with darker tips, length 16.5-22.0 mm.

Mandibles parallel-sided, clypeus acute below with scattered shallow punctures, sides with outstanding silvery pubescence, disk with shorter silvery hairs; frons dull, hardly punctured, with sparse outstanding brown hairs and some silvery pubescence; gena half as wide as eye, finely reticulate, hardly punctured; base of stipes and submentum with few black bristles. Antenna (Fig. 62) with segment 3 as long as 4 + 5, segment 4 3.5 times, 5 nearly 3 times as long as broad, 8 twice as long as broad, 12 curved, considerably flattened, end rounded, about as long as 11 which is flattened, nearly parallel-sided, lower edge a little raised and shining, 10 nearly straight and cylindrical but with a well-marked hump beneath, 9 a little humped, 5-8 with weak raised lines beneath. Mesosoma as in the ♀ but even less clearly punctured. Legs as in ♀. Gaster as in ♀ apart from the additional segment.

DISTRIBUTION (675 ♀, 101 ♂). **Sudan, Chad, Central African Republic, Senegal, Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ghana, Nigeria, Cameroun, Gabon, Fernando Po, Congo, Zaire, Rwanda** (Benoit, 1956: 552), **Burundi** (Benoit, 1956: 552), **Angola, Zimbabwe, Zambia, Uganda, Kenya, Malawi, Mozambique, Tanzania** (including Zanzibar), **South Africa** (Transvaal, Natal, Cape of Good Hope), **Botswana, Swaziland.**

England: 1 ♂, Sunderland, in shop in bananas, 24.ii.1950 (? from West Africa).

2 ♂ and 4 ♀ strepsipterous puparia have been seen, one beneath gastral tergite 3 of females, others beneath tergite 4, from Nigeria, Congo, Uganda, Malawi and Tanzania.

Belonogaster neavei sp. n.

MALE. Head ferruginous; ocellarium and antennal segments 1-3 above, blackish; greater dorsal part of mandibles, broad sides of clypeus, inner orbits to middle of ocular sinus, spot between antennal sockets, scape beneath, yellow or creamy. Mesosoma ferruginous, mesoscutum, posterior part of humeri, black; posterior margin of mesopleuron and much of propodeum somewhat darkened. Legs ferruginous; fore tarsus except central stripe of last segment, mid and hind tarsi, black; much of underside of propleuron, fore coxae, ventral stripe of fore femur, much of underside of mid coxa and anteroventral stripe of mid femur, yellow. Gaster black, petiole and most of anterior part of tergite 2, ferruginous with a small round yellow spot on each side of tergite 2. Wings reddish brown, tips fuscous, length 19.0 mm.

Clypeus pointed below but at an angle of about 120°, sides with silvery tomentum, disk and to less extent sides with fine outstanding black hairs. Frons dull, practically not punctured with long, fine outstanding dark hairs. Gena a little less than half as wide as eye in profile, rather shining, very indistinctly punctured. Base of submentum and stipes with a few long, fine dark hairs. Antennal segment 3 not quite as long as 4 + 5, 4 nearly 3 times, 5 2.5 times as long as broad, 8 twice as long as broad, 12 moderately flattened, inner side shining, dorsal edge curved, ventral edge straight, tip just pointed, a little shorter than in *B. grisea*, 9-11 with strong shining humps beneath, 10, 11 and 12 of about equal length, 5-8 with shining raised lines beneath. Whole mesosoma with dense silvery tomentum; mesoscutum, scutellum and metanotum with outstanding greyish hairs; mesoscutum with indistinct fine punctures, mesopleuron similar but punctures more distinct behind, scutellum and metanotum with stronger, closer punctures; propodeum with quite close outstanding rather long black hairs, with rather close, shallow punctures not striate, posterior depression one-third as long as propodeum, impressed line strong, anterior depression small but deep. Mesosternum in front of mid coxae with numerous long black hairs almost forming a tuft. Last segment of fore tarsus elongate; mid basitarsus shorter than in *B. grisea*; mid and hind femora beneath with silvery tomentum, hind tibiae and tarsi with some short, appressed black bristles. Gastral petiole long, little widened behind, spiracles little protruding, shining with some moderately long, black hairs; stalk of second gastral tergite nearly 3 times as long as broad, gaster posteriorly with dense silvery tomentum and some obliquely protruding pale bristles.

FEMALE. Head ferruginous, antennal segments 3-11 darkened above. Mesosoma black, anterior part of pronotum, scutellum, metanotum, propodeum near valves, meso- and metasternum, coxae and femora ferruginous, tibiae and tarsi mainly black. Gaster with petiole, segment 2 except narrow apical part, ferruginous, rest black. Wings red-brown, tips dark, length 19.0 mm.

Clypeus finely reticulate with scattered moderately large punctures; frons dull, reticulate, with fairly close punctures with very short outstanding black hairs; gena nearly as wide as eye in profile, very finely reticulate and punctured; base of submentum and stipes with very few dark hairs; antennal segment 3 as long as

4 + 5 + 6, 4 and 5 just longer than broad, 8 quadrate. Mesoscutum dull, reticulate, not perceptibly punctured. Scutellum, metanotum and mesopleuron distinctly punctured; mesosoma with dense silvery grey tomentum tending to hide the sculpture; propodeum with punctures but on angles more striate, with close short, outstanding dark hairs and rather sparse tomentum, posterior depression one-third as long as propodeum, impressed line distinct, anterior depression very small and transverse. Last segment of fore tarsus elongate, hind femur with scattered very short black bristles beneath, tibia with fewer but shorter bristles. Gastral petiole narrow and elongate, little widened behind, spiracles moderately protruding, tomentum very fine, hairs quite numerous below; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with dense tomentum but no protruding bristles.

Holotype ♂, Kenya: Masongaleni, ca 38°2'E, 2°4'S, 3000 ft [915 m], 29.iii.-1.iv.1911 (S. A. Neave) (BMNH).

Paratypes. Kenya: 10 ♀, same data as holotype (BMNH); 1 ♀, Kibwezi, 3000 ft [915 m], 2-4.iv.1911 (S. A. Neave); 1 ♂, Mombasa, 2.i.1913 (R. C. Wroughton) (BMNH); 1 ♂, Lumbusa, 1906 (with no yellow stripes on femora) (*M. de Rothschild*); 1 ♀, Nairobi, 1916 (*M. de Rothschild*) (MNHN, Paris); 1 ♀, Menengai, 6600 ft [2010 m], 7.v.1949 (R. A. Maas Geesteranus); 1 ♀, Teita distr., Wundangi, forest glades, 1400 m, 16-17.ix.1974 (R. de Jong) (RNH, Leiden). Zambia: 2 ♀, NW. of Kafue River, 23.viii.1913 (B. Russell) (UM, Oxford). Malawi: 1 ♂, Nkudsi Lake shore, 16.v.1970 (C. G. M. Schulten); 1 ♀, Limbe, 16.v.1968 (C. G. M. Schulten) (ITZ Amsterdam). Tanzania: 1 ♀, Lake Province, Old Shinyanga, 8.iv.1958 (O. W. Richards) (BMNH); 1 ♀, near Meru, 13 miles [21 km] N. of M'bagaris Village, 13.ii.1911 (BMNH); 4 ♀, Kilimandjaro (N. L. Abbott) (USNM). South Africa: 1 ♂, Transvaal, Soutpannsberg, vii. (G. A. J. Rothney, ex H. Rolle) (UM, Oxford); 1 ♂, Kosmos, 18.ii.1974 (A. & T. Simon Thomas). (ITZ, Amsterdam).

The two specimens from Malawi both contained Strepsiptera. The one from Nkudsi had 3 ♂ puparia, 2 under the centre of tergite 4 and 1 under the centre of tergite 5; the one from Limbe had 2 ♂ empty puparia under the right of tergite 3 and under the left of tergite 4.

Belonogaster leonina sp. n.

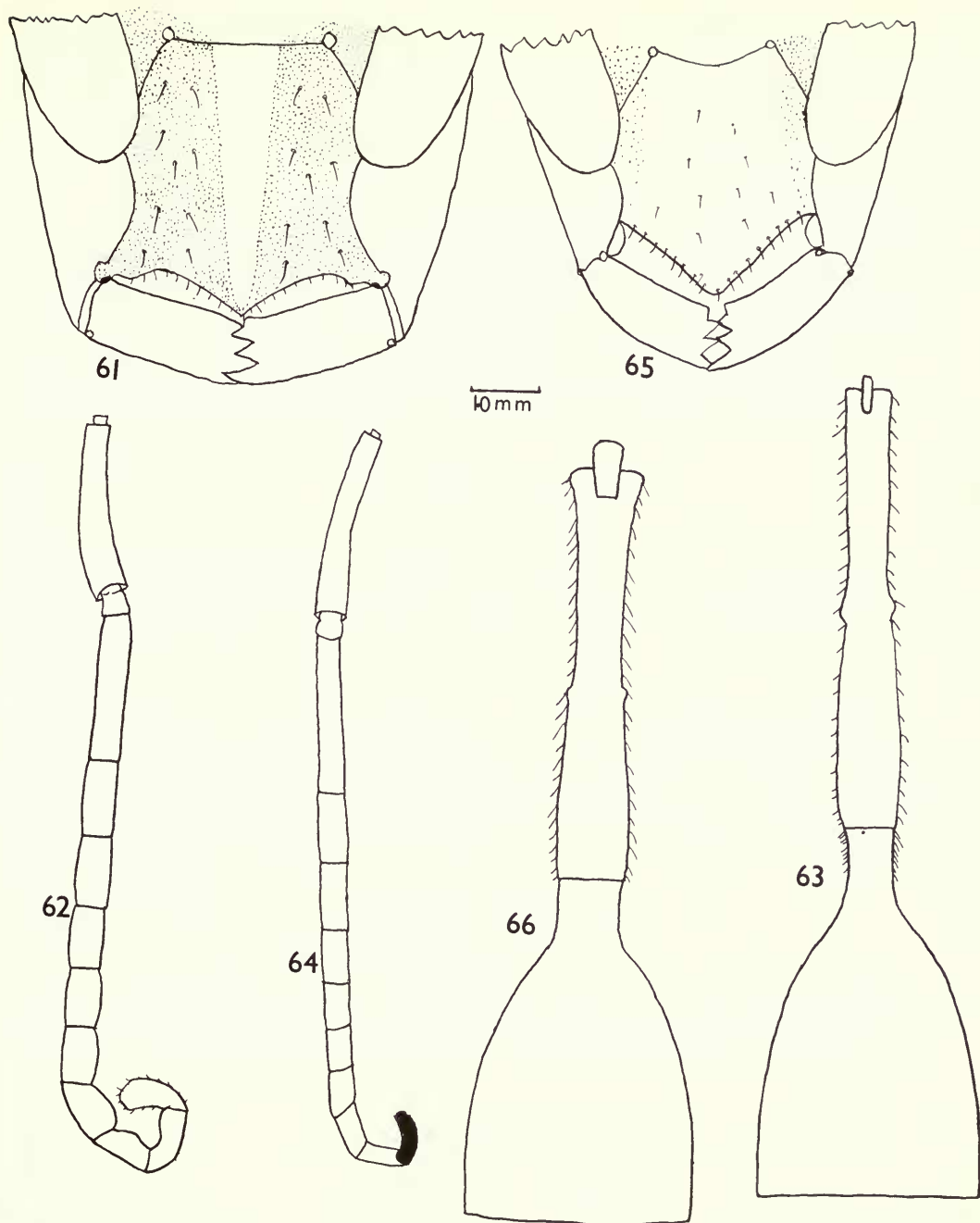
(Figs 63-65)

MALE. Head ferruginous; mandibles yellowish; sides of clypeus more or less, inner orbits, yellow; frons to just behind the ocelli black; antennal segments 3-8 usually blackish above, 10-11 yellowish brown (more ferruginous in the holotype), 12 shining, usually black, at least in greater part. Mesosoma dark ferruginous, mesoscutum more or less blackened. Legs ferruginous, tarsi more or less blackened, last segment and sometimes third and fourth more or less pale. Gastral petiole and basal part of segment 2 ferruginous, rest of gaster black. Wings light brown, tips not darkened, length 16.0 mm.

Clypeus (Fig. 65) not much produced below, projecting a little beyond the lateral lobes but centrally just obtusely pointed or just rounded, surface much flattened, coarsely reticulate without white tomentum and with very short dark bristles; frons dull, reticulate, not punctured with short outstanding black bristles; gena a little wider than eye, surface very finely reticulate, a little shining with a few fine punctures; base of submentum with dense group of short stout bristles; antennal (Fig. 64) segment 3 clearly longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 rather less than twice as long as broad, segment 12 rather short and flattened, shining, normally black, end rounded, dorsal edge slightly curved, ventral edge almost straight, 11 cylindrical, 10 slightly, 9 more strongly convex beneath, proximal segments without raised lines beneath. Mesoscutum and humeri granulate, scarcely punctured, tomentum brown, close but not conspicuous, no outstanding hairs; mesopleuron usually with rather more distinct punctures posteriorly; propodeum dull, granulate with traces of striae especially below, with moderately long black hairs, posterior depression one-third as long as propodeum, impressed line for two-thirds its length, anterior depression deep, fairly large. Last segment of fore tarsus elongate; mid and especially hind femora with black outstanding hairs beneath; hind tibia with a few black bristles beneath. Gastral petiole rather long and thin, with rather sparse hairs below, spiracles prominent, posterior part only slightly widened; stalk of second gastral segment 2.0-2.5 times as long as broad; gaster posteriorly with moderately dense greyish tomentum and a few protruding, hair-like black bristles.

FEMALE. Head ferruginous; frons black to just behind the ocelli; antennal segments 3-8 more or less blackened above. Mesosoma dark ferruginous, sometimes partly blackened, especially mesoscutum. Legs ferruginous, tarsi black, fifth segment ferruginous. Gaster black or blackish. Wings brown, tips not darkened, length 16.5-19.0 mm.

Clypeus acute below, greater part of surface dull and granulate, a few black bristles on lower quarter.



Figs 61–66 *Belonogaster*. 61, *B. leonhardii* du Buysson, ♂, clypeus. 62, *B. grisea* (F.), ♂, left antenna. 63–65, *B. leonina* sp. n. (63) ♀, gastral tergites 1–2; (64) ♂, left antenna; (65) ♂, clypeus. 66, *B. barbata* sp. n., ♀, gastral tergites 1–2.

Frons dull, granulate, hardly punctured with short, outstanding, black bristles. Gena about as wide as eye in profile, rather dull, finely reticulate with fine punctures especially below. Submentum with dense short black bristles at base. Antennal segment 3 distinctly longer than 4 + 5, 4 rather more than, 5 rather less than 1.5 times as long as broad, 8 a little longer than broad. Mesosoma as in the male but mesoscutum with some sparse outstanding short hairs. Legs as in male. Gastral petiole (Fig. 63) long and narrow, little widened

posteriorly, spiracles distinctly protruding, with silvery tomentum above and white hairs beneath; second gastral tergite (Fig. 63) with its stalk 2.0–2.5 times as long as broad, gaster posteriorly with rather dense silvery tomentum and a few protruding pale bristles.

Holotype ♂, **Sierra Leone**: Mattru, 8.x.1912 (*J. J. Simpson*) (BMNH).

Paratypes. **Congo**: 1 ♀, 4 ♂, Dimonika, 20.i.1977 (*Grillot & Morin*) (MNHN, Paris); 2 ♀, 21.i.1977 (*Grillot & Morin*); 4 ♀, 7 ♂, 28.i.1977 (*Grillot & Morin*); 1 ♀, 25.iii.1977 (*Grillot & Morin*); 1 ♀, 15.v.1977 (*Grillot & Morin*); 5 ♂, 16.v.1977, (*Grillot & Morin*); 4 ♀, 7 ♂, 18.v.1977, (*Grillot & Morin*); 16 ♀, 9 ♂, 18–30.i.1977, (*S. Kelner-Pillault*) (MNHN, Paris); 1 ♂, 1 ♀, 13.iv.1969 (*Grillot*); 2 ♂, 2 ♀, Piste de Drontià Pongga, 20.i.1977 (*S. Kelner-Pillault*); 1 ♂, Les Saras, Girard, 27.i.1977 (*Grillot & Morin*); 3 ♂, 2 ♀, Mataba, 22.i.1977 (*Grillot & Morin*); 1 ♂, Bouloungai, 17.v.1977 (*Grillot & Morin*); 2 ♂, Djoumonna, Yaka Yaka, 3.ii.1977 (*G. Morin*); 1 ♀, Foulakari, 8.i.1977 (*S. Kelner-Pillault*); 1 ♀, Masa, 6 i.1976 (*G. Onoré*); 1 ♀, Kintele, 15.i.1977 (*G. Onoré*); 1 ♀, N. Congo, route Odzala, Mbomo, 9.ii.1977 (*S. Kelner-Pillault*) (MNHN, Paris). **Gabon**: 4 ♂, 13 ♀, Mts de Cristal, Muni, 400 m, 15–31.x.1969 (*A. Villiers*); 1 ♂, Komo, Mts de Cristal, 1–15.x.1969 (*A. Villiers*) (MNHN, Paris). **Uganda**: 1 ♀, 3–4 miles [5–6 km] NE. of Entebbe, 3800 ft [1160 m], near Lake Sebogwavos, 12–13.ii.1912 (*C. A. Wiggins*); 1 ♀, about 3 miles [5 km] NNE. of Entebbe, 3800 ft [1160 m], 13.vi.1912 (*C. A. Wiggins*); 1 ♀, about 2 miles [3 km] ENE. of Entebbe, 3800 ft [1160 m], 21.vi.1912 (*C. A. Wiggins*) (UM, Oxford).

Belonogaster barbata sp. n.

(Fig. 66)

FEMALE. Head ferruginous, frons black to just behind the ocelli, also a small oblique black spot behind each eye; antenna with scape ferruginous somewhat darkened dorsally, 2–11 black, somewhat ferruginous-blotched beneath. Mesosoma ferruginous, sides and central stripe of mesoscutum blackened. Legs ferruginous, tibiae and tarsi black. Gaster ferruginous, some darker blotches posteriorly. Wings dark reddish brown, length 19.5 mm.

Clypeus acute below, lower half with large punctures, distinctly convex, moderately dull; finely reticulate with close pale tomentum and numerous short black bristles all over; frons dull reticulate with rather numerous not very small punctures, short outstanding black bristles and rather close pale brown tomentum. Gena slightly wider than eye in profile, rather dull, finely reticulate with moderately numerous small punctures below. Antennal segment 3 clearly longer than 4 + 5, 4 1.5 times as long as broad, 5 shorter, 8 quadrate. Mesoscutum with no outstanding hairs or bristles, a few indistinct punctures at sides, with inconspicuous pale tomentum; humeri with numerous short black bristles arising from small punctures and close pale tomentum; mesopleuron reticulate, slightly shining, with numerous small punctures and slight tomentum; scutellum and metanotum with short outstanding black bristles; propodeum rather weakly punctate-striate with not very dense silvery tomentum and numerous depressed short black bristles, posterior depression about one-quarter as long as propodeum, impressed line to mid-point, anterior depression large and deep. Fifth segment of fore tarsus elongate; mid and especially hind femur with short black bristles beneath, especially near base; hind tibia with short oblique black bristles beneath especially towards apex. Gastral petiole (Fig. 66) rather short and stout, spiracles not very prominent, with numerous short recumbent black bristles above, more semirecumbent below; stalk of second gastral tergite 1.5 times as long as broad, gaster posteriorly with close pale tomentum and no protruding black bristles.

MALE. Not seen.

Holotype ♀, **Congo**: Voka, 19.xi.1975 (*G. Onoré*) (MNHN, Paris).

Belonogaster brevitarsus sp. n.

(Figs 67, 68)

MALE. Head ferruginous, mandibles, sides of clypeus and inner orbits to near middle of ocular sinus, creamy white, frons a little darkened, antennal segments 1–8 darkened above. Mesosoma ferruginous, pronotum dorsally, mesoscutum and propodeum slightly, darkened. Legs ferruginous, mid and hind tarsi black. Gaster black, petiole and stalk of second tergite black. Wings light brown, length 16.5 mm.

Clypeus below rounded, very obtuse, surface with silvery hairs, especially at sides; frons with weak punctures and outstanding black hairs; gena about half as wide as eye in profile, finely granulate; submentum with a tuft of long black bristles at base; antennal segment 3 as long as 4 + 5, 4 and 5 a little more than twice as long as broad, 8 about 1.5 times as long as broad, segment 12 a little flattened, broadened to the

rounded apex, curved both dorsally and ventrally, underside from tip to mid point with a black line, 11 and 10 about as long as 5, 11 very strongly convex beneath, 10 beneath with a small but conspicuous knob, 9 with a small knob beneath, 4-8 with a raised line. Mesoscutum with large shallow punctures almost hidden by dense silvery tomentum and short outstanding black hairs; propodeum with angles weakly punctate-striate with appressed silvery hairs and long outstanding black hairs, posterior depression one-quarter as long as propodeum, no impressed line or anterior depression. Hind femur with dense outstanding white pile beneath, also scattered longer fine black bristles; hind tibia without dense long hairs beneath; fore tarsus widened, last segment short oval (Fig. 68); mid tarsus (Fig. 68) flattened and widened, segment 4 much broader than long. Gaster with petiole moderately slender, distinctly widened to apex, spiracles moderately protruding, numerous moderately long, oblique hairs; stalk of second gastral tergite 2.5-3.0 times as long as broad, gaster posteriorly with dense silvery tomentum and short protruding black bristles.

FEMALE. Head ferruginous, flagellum blackened above. Mesosoma ferruginous, mesoscutum and dorsal side of pronotum blackish. Legs ferruginous, tarsi and mid and hind tibiae black. Wings light brown, length 16.5 mm.

Clypeus acute below, finely reticulate, a little shining below where there are large punctures and short outstanding black bristles; frons with fine punctures and short outstanding black bristles; gena rather more than half as wide as eye in profile, granulate with scattered punctures; base of submentum with some short black bristles; antennal segment 3 as long as 4 + 5 + half 6, 4 just, 5 distinctly less than twice as long as broad, 8 quadrate. Mesoscutum granulate, often also punctured, with silvery tomentum; scutellum and metanotum indistinctly punctured; mesopleuron and propodeum inconspicuously punctured, propodeum with weak striae on the angles and moderately long outstanding black hairs, posterior depression one-third as long as propodeum, impressed line weak, anterior depression very weak. Last segment of fore tarsus (Fig. 67) distinctly short; hind femur with moderately numerous black bristles beneath. Gaster with petiole slender, little widened posteriorly, spiracles rather prominent, short silvery appressed hairs and some longer outstanding ones; stalk of second gastral tergite 3-4 times as long as broad; gaster posteriorly with dense silvery tomentum and some protruding longer black hairs.

Holotype ♂, **Uganda:** Mabira forest, Chagwe, 3500-3800 ft, [1070-1160 m], 16-25.vii.1911 (*S. A. Neave*) (BMNH).

Paratypes. **Uganda:** 1 ♂, 5 ♀, same data as holotype; 1 ♀, shores of Lake Wamala (Isolt), 3800 ft [1160 m], 7-8.i.1912 (*S. A. Neave*) (BMNH); 1 ♂, Buamba Forest, Semliki Valley, 2300-2800 ft [700-850 m], 3-7.xi.1911 (*S. A. Neave*) (BMNH). **Kenya:** 1 ♂, Rabai, 39°34'E, 3°55'S, v.1928 (*V. G. L. van Someren*) (BMNH). **Zaire:** 1 ♀, Shaba province (Katanga), R. Lufira, 3500 ft [1070 m], 10.ix.1907 (*S. A. Neave*) (UM, Oxford) (probably this species, but in bad condition). **Rwanda:** 1 ♀, Kigali, 16.xii.1979 (*H. J. Freijen*) (ITZ, Amsterdam).

Belonogaster saussurei Kirby

(Fig. 69)

Belonogaster saussurei Kirby, 1881: 649; Forbes, 1903: 256, pl. 16, fig. 8. **LECTOTYPE** ♂, SOUTHERN YEMEN: Socotra (*Balfour*) (BMNH), here designated [examined].

Belonogaster tricolor Taschenberg, 1883: 175. Syntypes 2 ♀, SOUTHERN YEMEN: Socotra (depository unknown).

FEMALE. Head ferruginous, clypeus a little yellow tinged. Mesosoma black, pronotum, scutellum, metanotum, posterior margin of propodeum, centre of mesosternum, ferruginous. Legs ferruginous, narrow apical band of tergite 2, tergites 3-4, black; transverse comma-shaped pale yellow mark on black band of tergite 2; sternites ferruginous, apical band of sternite 2, sternites 3-4 black, sternite 2 with two small yellow spots. Wings purplish black, costa to pterostigma reddish brown, length 17.0-20.0 mm.

Clypeus acute below, finely reticulate with numerous scattered large punctures bearing brown bristles, almost no tomentum; frons dull, reticulate, closely punctured in front and at sides, bearing outstanding black bristles, a little silvery tomentum; gena almost as wide as eye in profile, finely reticulate, more shining below, numerous rather fine punctures; base of stipes and submentum with a few pale bristles; antenna with segment 3 much longer than 4 + 5, 4 and 5 very little longer than broad, 8 quadrate. Mesoscutum and humeri dull, reticulate with numerous rather small outstanding bristles and not very close brown tomentum, mesopleuron similar but rather more punctured; scutellum and metanotum punctured with black bristles at sides, former with a strong impressed line; propodeum as in ♂ but anterior depression larger. Last segment of fore tarsus elongate; fore, mid and to less extent hind femur beneath with outstanding short pale pile, no bristles; hind tibia with a few pale bristles. Gastral petiole rather long and narrow, gradually and little

widened posteriorly, spiracles moderately protuberant, with sparse pale tomentum and a few short pale bristles; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with moderately dense pale tomentum but no bristles.

MALE. Head light ferruginous; most of mandibles, face, up to level of centre of ocular sinus, except a feeble central stripe on clypeus, scape beneath, spot on malar space which are yellow. Mesosoma black, pronotum, scutellum, metanotum, centre of mesosternum, posterior margin of propodeum, ferruginous. Legs ferruginous. Gaster ferruginous, narrow apex of tergite 2 and whole of 3-4, blackish; tergite 2 with two large transverse pale yellow comma-shaped spots on black area; sternite ferruginous, posteriorly narrowly blackish with irregular pale yellow band, sternites 3-4 darkened. Wings dark brown, costa more reddish, length 15.5-18.0 mm.

Clypeus acute below, shining, very feebly reticulate with scattered punctures bearing short pale bristles, mainly at sides, a band of short silvery tomentum on each side; frons dull, reticulate, with scattered punctures in front and at sides, very short outstanding black bristles and a little silvery tomentum; gena a little wider than half the eye-width in profile, dull, finely reticulate with a few scattered punctures; base of submentum with a small tuft of black bristles; antenna (Fig. 69) with segment 3 about as long as 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 twice as long as broad, 12 slightly flattened, a little curved, mainly above, almost straight below, tip rounded, a little longer than 8, 11 with a strong protuberance beneath, 8-10 with weaker but longer ones, 5-7 with a weak raised line beneath. Mesoscutum and mesopleuron distinctly and moderately closely punctured, humeri weakly punctured; mesoscutum with sparse greyish tomentum, humeri without outstanding bristles; scutellum and metanotum punctured with short black bristles at sides, former with a strong impressed line; propodeum quite strongly punctate-striate, punctured at sides, with sparse brown tomentum and close short outstanding black bristles, posterior depression not quite half as long as propodeum, impressed line strong, anterior depression small, deep. Last segment of fore tarsus elongate; femora beneath with feeble outstanding pile, no bristles, hind tibia with no bristles. Gastral petiole rather short and thick, spiracles moderately prominent, petiole very little widened posteriorly, with close pale tomentum but no bristles; stalk of second gastral tergite 2.5 times as long as broad or rather less, gaster posteriorly with not very dense pale tomentum but no bristles.

DISTRIBUTION (8 ♂, 40 ♀). **Southern Yemen** (Socotra, rather common up to 1500 ft [460 m], 18.i. to 30.iv. also a few in viii; 2 ♀, Aden, Kharmaksar, 13.iii.1967 (*K. M. Guichard*)).

Kohl (1906: 223) records *saussurei* from Socotra, the small island of Semha (ca 12°20'N, 52°5'E), and from Ras Fartak in Southern Yemen. He seemed to be a little doubtful about the correctness of these records; it is possible they were founded on specimens of *B. guichardi*.

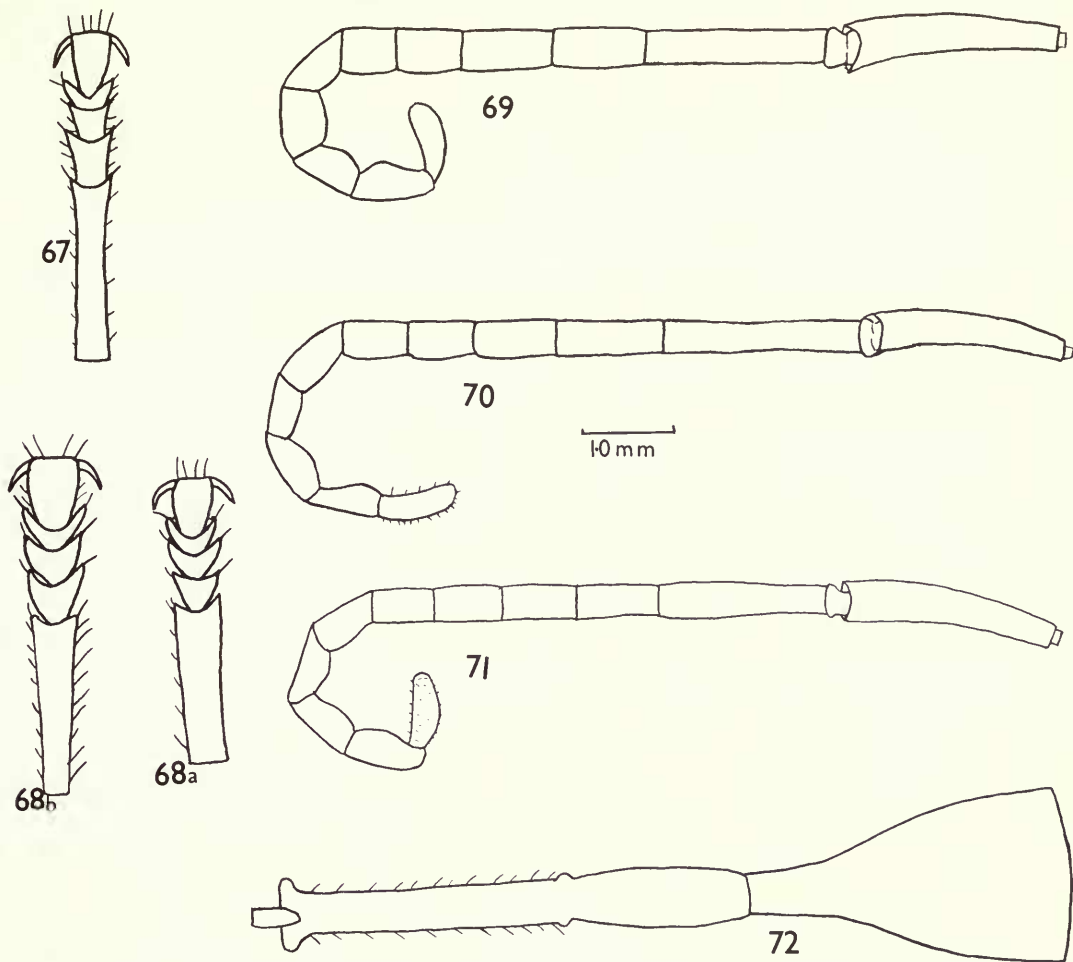
Belonogaster guichardi sp. n.

(Fig. 70)

MALE. Light ferruginous, gastral tergite 2 narrowly apically, tergite 3 except narrow apex, more than basal half of tergite 4, most of sternites 3-4, black; broad sides of clypeus, inner orbits from bottom of sinus, spot between antennae, creamy white. Tergite 2 with narrow transverse spots at apex, apical band of sternite 2, pale yellow; mid coxa partly yellow beneath. Wings dark purplish brown, veins reddish, length 18.0 mm.

Clypeus acute below, a little shining, hardly reticulate with scattered large punctures, sides with not very dense silvery tomentum, punctures on discal stripe with black bristles; frons with small indistinct punctures, very finely reticulate with short outstanding black bristles; gena about two-thirds as wide as eye in profile, finely reticulate with scattered small punctures; base of submentum with a small tuft of outstanding bristles; antennal segment 3 (Fig. 70) hardly longer than 4 + 5, 4 2.5 times as long as broad, 5 a little shorter, 8 about 2.33 times as long as broad, 12 about as long as 9, strongly flattened, curved above, straight below, tip rounded, 9-11 with ventral prominences which are curved beneath (less so on 9). Thorax with fine, not very conspicuous punctures and very inconspicuous tomentum; propodeum more strongly punctured, angles punctate-striate, tomentum inconspicuous, outstanding black bristles short and not very dense, posterior depression about half as long as propodeum; impressed line strong, anterior depression large, elongate. Last segment of fore tarsus elongate; hind femur with white tomentum beneath but no bristles. Gastral petiole moderately long, distinctly widened at apex, spiracles moderately protuberant, surface with sparse pale tomentum and a few short bristles; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with not very dense pale tomentum and some obliquely outstanding pale bristles.

FEMALE. Ferruginous; spot on lateral lobes of clypeus, elongate subapical transverse spots on gastral tergite 2, two small subapical spots on sternite 2, yellow; narrow apical area on gastral tergite 2, large basal part of tergites and sternites 3-4, black. Wings dark purplish brown, veins red-brown, length 18.0-21.0 mm.



Figs 67-72 *Belonogaster*. 67, 68, *B. brevitarsus* sp. n. (67) ♀, fore tarsus; (68) ♂, fore (a) and mid (b) tarsus. 69, *B. saussurei* Kirby, ♂, left antenna. 70, *B. guichardi* sp. n., ♂, left antenna. 71, *B. abyssinica* du Buysson, ♂, left antenna. 72, *B. arabica* Giordani Soika, ♂, gastral tergites 1-2.

Clypeus acute below, very weakly reticulate with scattered large punctures bearing brown bristles; frons with numerous rather small punctures, interstices finely reticulate with short outstanding bristles; gena about as wide as eye in profile, finely reticulate with numerous moderately large punctures which on dorsal part bear short black bristles; base of stipes and submentum with moderately long black bristles; antenna with segment 3 as long as 4 + 5 + 6, 4 and 5 only a little longer than broad, 8 quadrate. Thorax with numerous, quite distinct, fine punctures and very inconspicuous brownish tomentum; propodeum as in ♂ but anterior depression smaller. Last segment of fore tarsus elongate; hind femur with dense silvery tomentum beneath. Gastral petiole rather long, distinctly widened at apex, spiracles little protuberant, tomentum not close, few short bristles; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with dense silvery tomentum and some obliquely projecting brown bristles.

Holotype ♂, **Oman**: Dhofar, Ayun Pools, 700 m, 10.x.1977 (*K. M. Guichard*) (BMNH).

Paratypes. **Oman**: 1 ♂, 13 ♀, same data as holotype; 1 ♀, Wadi Sayk, 26.ix.1977 (*K. M. Guichard*); 2 ♀, Qara Hills, north slopes, 670 m, 22.ix.1977 (*K. M. Guichard*) (BMNH).

This species, *B. saussurei*, *B. abyssinica*, *B. adenensis*, *B. arabica* and *B. filiformis* are all very closely similar and the females in some cases scarcely separable but the males seem to show small differences, especially in the antennae, and the distributions are often such that it is not easy to treat any of them as subspecies.

Belonogaster abyssinica du Buysson

(Fig. 71)

Belonogaster abyssinicus du Buysson, 1906: 190; 1909: 223, 263, pl. 4, fig. 4. LECTOTYPE ♀, ETHIOPIA: 'Abyssinie', 1882 (*Raffray*) (MNHN, Paris), here designated [examined].

FEMALE. Head ferruginous, including antennae, frons and area round the foramen black. Mesosoma black; ventral corner of pronotum, hind margin of scutellum, metanotum, posterior margin of propodeum, propleuron, reddish. Legs blackish brown, coxae reddish tinged. Gaster blackish, petiole and stalk of tergite 2 ferruginous; rarely two small yellow spots before apex of tergite 2. Wings dark purplish brown, length 14.0–20.0 mm.

Clypeus acute below, very finely reticulate with numerous quite large punctures and some black bristles; frons strongly reticulate with close small punctures and only on the vertex black, outstanding hairs, a strong impressed line from median ocellus forwards; gena not quite as broad as eye in profile, finely reticulate, more shining below, with numerous fine punctures; base of stipes and submentum with numerous outstanding black bristles; antennal segment 3 much longer than 4 + 5, 4 and 5 only a little longer than broad, 8 quadrate. Mesoscutum and humeri dull, reticulate with quite close punctures especially on the mesoscutum, feeble brownish tomentum and a few outstanding hairs; mesopleuron similar; scutellum closely and rather more strongly punctured, central impressed line weak; metanotum similar but no impressed line though central band less punctured; propodeum strongly punctate-striate, more punctured at sides, with very feeble pale tomentum and numerous short outstanding dark hairs, posterior depression not quite half as long as propodeum, impressed line complete but not strong, anterior depression deep and rather large. Fore tarsus with last segment elongate; fore and mid femur beneath with outstanding white pile, less distinct on hind femur which has a very few fine bristles near base beneath. Gastral petiole rather long and thin, regularly but little widened posteriorly, very little tomentum and a few short bristles, spiracles hardly protruding; second gastral tergite with stalk 2.5 times as long as broad; gaster posteriorly with short and not very close silvery tomentum, no bristles.

MALE. Head ferruginous; frons black; face yellow with a wide central stripe ferruginous except for a yellow spot above the antennal sockets. Mesosoma black, propodeum below and mesosternum more or less ferruginous. Legs ferruginous, mid coxa beneath, mid femur anteriorly, trace on anterior basal half of hind femur, yellow. Gaster ferruginous, posterior third of tergite 2 and tergites 3–4 black. Wings brown, length 17.0 mm.

Clypeus acute below but not very strongly projecting, numerous moderately strong punctures and not very dense silvery hairs; frons dull, finely reticulate with moderately dense coarse punctures and outstanding brownish hairs; gena as wide as eye in profile, dull, finely reticulate with scattered rather fine punctures; antennal segment 3 (Fig. 71) distinctly longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 a little more than twice as long as broad, 12 flattened, a little curved above, almost straight below, a little longer than 9, 10 and 11 only feebly projecting beneath. Mesoscutum and humeri with fairly distinct fine hairs, with small distinct punctures. Mesopleuron rather more distinctly punctured and very finely reticulate; propodeum dull, strongly and moderately closely punctured, traces of striae dorsally, hairs long at sides, not very dense, posterior depression half as long as propodeum, impressed line weak, anterior depression transverse, moderately deep. Fore tarsus with last segment elongate; hind femur with pale tomentum but no bristles beneath. Gastral petiole moderately long, little widened posteriorly, spiracles hardly projecting; second gastral tergite with stalk 2.5 times as long as broad; gaster posteriorly with fine inconspicuous pale tomentum and no protruding bristles.

DISTRIBUTION. (11 ♀, 4 ♂). **Ethiopia** (unlocalized, 4 ♂, 9 ♀, including lectotype (MNHN, Paris); 1 ♀, High Simien, 30.x.1911 (*R. J. Stordy*) (BMNH)), **Djibouti** (1 ♀, Menabella, 26.vi.1903 (*A. Bonoure*) (MNHN, Paris)).

Belonogaster arabica Giordani Soika **stat. n.**

(Figs 72, 73)

Belonogaster grisea subsp. *arabicus* Giordani Soika, 1958: 484. Holotype ♀, SOUTHERN YEMEN: Dhala, 4800 ft [1460 m], 14.ix.1937 (*H. Scott, E. B. Britton*) (BMNH) [examined].

FEMALE. Light ferruginous; lateral lobes of clypeus yellowish; gastral tergites 2-4 a little darker, tergite and sternite 2 with narrow transverse yellow spots. Wings light reddish brown, tips dark fuscous, length 17.0-21.5 mm.

Tomentum everywhere very short and sparse, reddish. Clypeus acute below with numerous scattered large punctures, dorsal two-thirds dull, finely granulate; frons with numerous small punctures and short outstanding black bristles, occiput with outstanding black bristles, mainly at sides; gena distinctly wider than eye in profile, almost whole surface with scattered small punctures; base of submentum with a few outstanding brown bristles; antenna with segment 3 not quite as long as 4 + 5 + 6, 4 and 5 both a little longer than broad, 8 just longer than broad. Mesoscutum and humeri and mesopleuron with numerous small punctures, rather closer and coarser on the scutellum and especially the metanotum; propodeum punctured with a few striae on the angles below, posterior depression a little more than one-quarter as long as propodeum, impressed line strong, anterior depression large but only centre deep. Fore tarsus with last segment elongate; mid and hind femora with close white tomentum but very few bristles beneath. Gastral petiole long and rather narrow, little widened posteriorly, spiracles hardly protruding; stalk of second tergite 2 or more often 2.5 times as long as broad; gaster posteriorly with pale reddish tomentum and a few protruding reddish bristles.

MALE. Light ferruginous; more than dorsal half of mandibles, broad sides of clypeus, inner orbits to bottom of ocular sinus, spot between the antennal sockets, narrow spots at apex of gastral tergite and sternite 2, yellow. Wings reddish brown, tips dark fuscous, length 18.0-20.0 mm.

Clypeus quite strongly pointed and acute below with scattered large punctures on lower half, long silvery pubescence on the yellow areas; frons with numerous small punctures and outstanding short black hairs, occiput also with a few black bristles; gena a little wider than eye in profile, dull with a few small punctures below; base of submentum with a few outstanding black bristles; antennal segment 3 hardly longer than 4 + 5, segments 4 and 5 2.5 times as long as broad or rather more, 8 rather more than twice as long as broad, 12 about as long as 9, moderately flattened, curved above, nearly straight below, tip rounded, dull, 9-11 (Fig. 73) in dorsal view narrow, with a strong rounded hump beneath, 5-8 with a raised line beneath. Mesosoma and legs as in ♀. Gastral petiole (Fig. 72) rather wider at base than in ♀ and less widened at apex, spiracles more projecting, stalk of second tergite twice as long as broad.

DISTRIBUTION (15 ♀, 4 ♂). **Southern Yemen** (2 ♀, 4 ♂, Dhala, 4800-5500 ft [1460-1680 mm], 14.ix.1937 (*H. Scott, E. B. Britton*) (BMH)); 1 ♀, Hadhramaut, Mahymud, 26.xi.1934 (*W. H. Ingram*) (BMNH)), **Yemen** (11 ♀, Ghaiman, ca 9 miles [14.5 km] SE. of Sana's, 8000-9000 ft [2440-2745 m], 17.ii.1938 (*H. Scott, E. B. Britton*) (BMNH)), **Saudi Arabia** (1 ♀, Khamis, Wadi Morba, 17.iv. (*W. Büttiker*) (BMNH)).

The female is hardly distinguishable from that of *B. filiformis* but the males seem to be distinct.

Belonogaster longitarsus sp. n.

(Figs 74-76)

MALE. Ferruginous; mandibles, broad stripes at sides of clypeus, inner orbits, pale yellow; mesosternum, fore and mid coxae beneath, mid and hind femora and tibiae with antero-ventral stripes, suffused spots on gastral tergite 2, yellow; antennal segments 1-8 above, tarsi, darkened; wings brownish hyaline, tips hardly darker, length 15.0 mm.

Clypeus acute below, surface very finely reticulate, a little shining, a band of silvery pubescence on each side, a few short black bristles, scattered especially on the central stripe and on upper half; frons dull, reticulate with a few small punctures and fairly numerous short, outstanding black bristles; gena a little more than half as wide as eye in profile, finely reticulate, not punctured; antennal segment 3 distinctly longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 about 2.25 times as long as broad, segment 12 (Fig. 75) moderately curved and flattened, tip rounded, as long as 9, 10-11 with strong prominences beneath, 7-9 with raised lines beneath. Humeri and mesoscutum with not very dense silvery tomentum and sparse fine punctures, mesopleuron similar but rather more punctured; scutellum with a weak central line, it and metanotum clearly punctured; propodeum with weak striae and punctures but quite distinct silvery tomentum and close short brownish hairs, posterior depression one-third as long as propodeum, impressed line hardly developed, anterior depression small and shallow. Last segment of fore tarsus elongate; femora beneath with sparse tomentum and sparse short black hairs. Gastral petiole long and slender, spiracles prominent, distal part scarcely widened and almost as long as the prespiracular part; stalk of second gastral tergite a little more than twice as long as broad; gaster posteriorly with not very dense silvery tomentum and a few projecting hairs, some of which are dark.

FEMALE. Ferruginous; antennae above and tarsi above, darkened; gastral tergite 2 often with 2 yellow spots; wings brown or light brown, tips sometimes a little darkened, length 15.0–21.0 mm.

Clypeus acute below, very finely reticulate with scattered moderate-sized punctured, dull, very little tomentum, a few pale bristles; frons dull, reticulate, rather close moderate-sized punctures and not close outstanding blackish bristles, little tomentum; gena a little more than half as wide as eye in profile, finely reticulate, a little shining with scattered punctures; base of submentum with very few bristles; antennal segment 3 much longer than 4 + 5, 4 and 5 a little longer than broad, 8 a little shorter than broad. Mesoscutum and humeri with a few fine short hairs, a few inconspicuous punctures and moderately close, very fine brownish tomentum, mesopleuron similar but more distinctly punctured, scutellum with a very feeble central line, it and metanotum more strongly punctured; propodeum weakly punctured or punctate-striate, dull, reticulate with some pale tomentum and short not very close outstanding black hairs, posterior depression a little less than half as long as propodeum, impressed line very feeble, anterior depression small but deep. Last segment of fore tarsus (Fig. 74) elongate, femora beneath with fine tomentum and rather sparse short bristles. Gastral petiole rather long and slender, spiracles projecting, posterior part little widened; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with rather close silvery tomentum and a few scattered pale bristles.

Holotype ♂, **Uganda**: banks of Victoria Nile near Masindi Port, 3400 ft [1040 m], 20–22.xii.1911 (S. A. Neave) (BMNH).

Paratypes. **Zambia**: 1 ♀, Zambesi Victoria Falls, 3000 ft [915 m], 15.ix.1905 (G. B. Longstaff) (stalk of second gastral tergite only 1.5 times as long as broad) (UM, Oxford). **Kenya**: 2 ♀, Mombasa, Kilindini, 22.ix.1905 (C. A. Wiggins) (UM, Oxford). **Uganda**: 1 ♀, same data as holotype (BMNH); 1 ♀, Tero Forest, SE. Buddu, 3800 ft [1160 m], 26–30.ix.1911 (S. A. Neave); 1 ♀, between Mitiana and Entebbe, 3800 ft [1160 m], 9–11.i.1912 (S. A. Neave); 1 ♀, Entebbe, i.1913 (C. C. Gowdey) (BMNH). **Zambia**: 1 ♀, Feira, 3.iv.1911 (F. V. Bruce-Miller) (BMNH). **Mozambique**: 2 ♀, Beira, 11 and 13.x.1939 (Dr. A. H. Newton) (BMNH). **South Africa**: 1 ♀, Transvaal, Merensky Dam, Tzaneen, 18.ii.1968 (Paul J. Spangler) (USNM); 1 ♀, Cape Province, East London, 24.iii.1914 (G. B. Longstaff) (UM, Oxford); 1 ♀, Natal, Durban, iv.1896 (F. N. Brown) (UM, Oxford). **Angola**: 1 ♀, Bruco, 26.ii.–2.iii.1972 (Southern African Exped.) (BMNH). **Tanzania**: 1 ♀, Kilimandjaro, SE. slopes, Kilema, 1440 m, iii.1912 (Alluaud, Jeanne) (MNHN, Paris).

A nest with four females from Kenya: Mombasa, Kilindi district, 23.x., is in UM, Oxford. Comb with a 6.0 mm peduncle probably removed from a twig. Two closed white cocoon-caps with a little carton network on the white silk; dome very convex, 7.0 mm diameter, cell 23.0 mm long. Four rather short open cells and 22 very short ones with dead 1st or 2nd instar larvae. Carton light brown.

Belonogaster adenensis Giordani Soika stat. n.

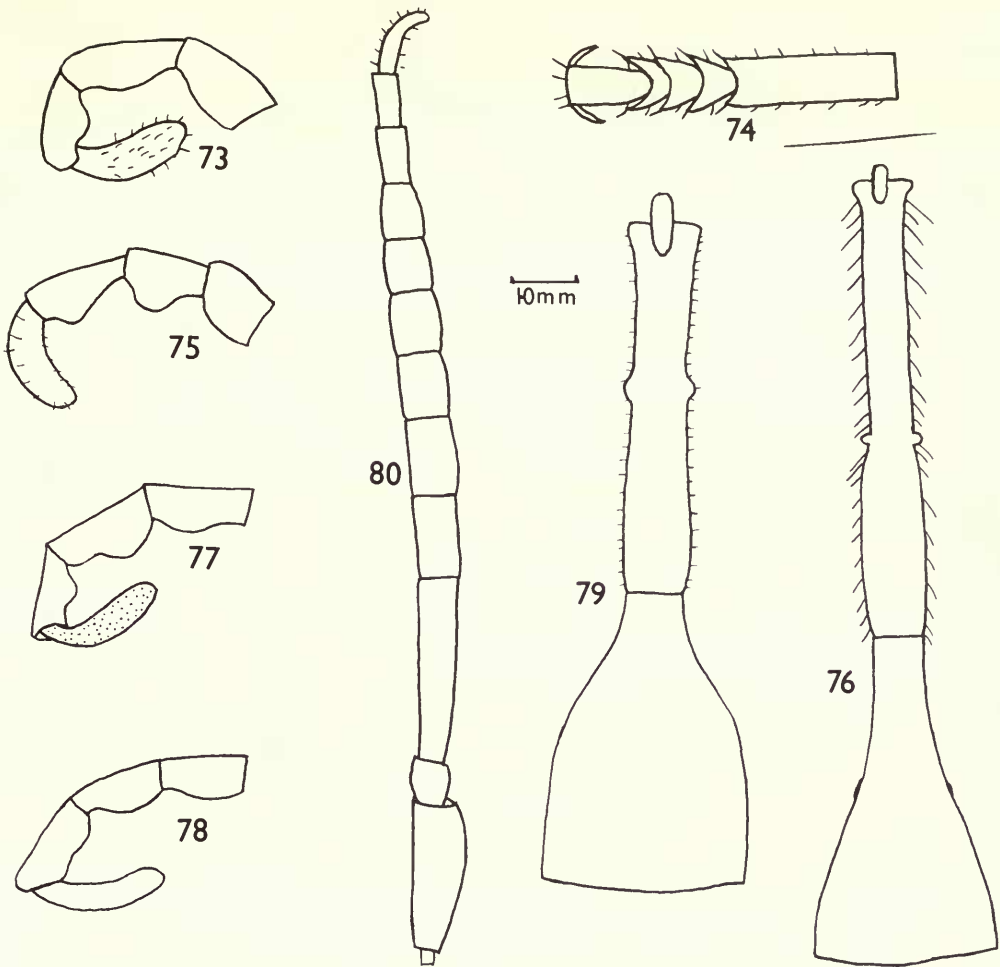
(Fig. 77)

Belonogaster abyssinicus subsp. *adenensis* Giordani Soika, 1957: 484.

There are two subspecies and the colours are described under each of them.

MALE. Clypeus acute below, surface slightly convex, slightly reticulate with a few large punctures below, with dense short silvery pubescence and on the upper half a very few short black bristles; frons dull, reticulate with fairly numerous small punctures in front and short outstanding black bristles; gena not quite as wide as eye in profile, reticulate, scarcely punctured; base of submentum with a tuft of black bristles; antenna with segment 3 clearly longer than 4 + 5, 4 and 4 about 2.5 times as long as broad, 8 just over twice as long as broad, 12 (Fig. 77) about as long as 7, distinctly flattened but not very wide, well curved above, nearly straight below, tip rounded, with tomentum rather than short hairs, 9–11 with strong rounded protuberances beneath, 5–8 with raised lines beneath. Mesoscutum scarcely punctured, humeri with some very fine punctures, mesopleuron more distinctly punctured, whole with dense appressed brownish tomentum; propodeum with quite strong punctures, angles more punctate-striate, with short black bristles and very short tomentum, posterior depression to mid point, impressed line complete, anterior depression large, elongate. Last segment of fore tarsus elongate; hind femur with inconspicuous white tomentum but no bristles beneath. Gastral petiole moderately long and stout, little widened posteriorly, spiracles little projecting, little tomentum, bristles very short; stalk of gastral tergite 2 about twice as long as broad, gaster posteriorly with inconspicuous pale tomentum and some fine black hairs, but no real bristles.

FEMALE. Not structurally distinct from *B. arabica* (p. 96).



Figs 73–80 *Belonogaster*. 73, *B. arabica* Giordani Soika, ♂, left antenna, segments 9–12. 74–76, *B. longitarsus* sp. n. (74) ♀, fore tarsus; (75) ♂, left antenna, segments 9–12; (76) ♂, gastral tergites 1–2. 77, *B. adenensis* Giordani Soika, ♂, left antenna, segments 9–12. 78, *B. filiformis* (de Saussure), ♂, left antenna, segments 9–12. 79, 80, *B. brevipetiolata* de Saussure. (79), ♀, gastral tergites 1–2; (80) ♂, left antenna.

***Belonogaster adenensis adenensis* Giordani Soika**

Belonogaster abyssinicus subsp. *adenensis* Giordani Soika, 1957: 484. Holotype ♀, SOUTHERN YEMEN: Jebel Jihaf, 7100 ft [2165 m], ix.1937 (*H. Scott, E. B. Britton*) (BMNH) [examined].

FEMALE. Light ferruginous; sides of clypeus more or less yellow, gastral tergites 3–4 black. Wings yellow-brown, tips widely dark fuscous, length 17.0–20.0 mm.

MALE. Light ferruginous; mandibles except narrow ventral margin, clypeus except pitchy ventral margin and narrow central stripe, inner orbits to centre of ocular sinus, spot between antennal sockets, light yellow to creamy white; small spot beneath tip of fore coxa, yellow; gastral tergite 2 with two narrow, somewhat comma-shaped transverse spots not quite forming a band, sternite 2 with a narrow apical band, yellow. Wings brown, tips a little darker, length 18.5 mm.

DISTRIBUTION. Southern Yemen (2 ♀ (including holotype), 4 ♂, Jebel Jihaf, 7100 ft [2165 m], ix.1937 (*H. Scott, E. B. Britton*); 1 ♂, 1 ♀, Jebel Jihaf, Wadi Lejjij, 7000 ft [2135 m], 1.x.1937 (*H. Scott, E. B. Britton*); 7 ♀, Dhala 4800–5500 ft [1460–1680 m], 12–15.ix.1937 (*H. Scott, E. B. Britton*)), Yemen (1 ♀, Sana'a, 7000 ft [2135 m],

ii.1938) (*H. Scott, E. B. Britton*); 1 ♀, vi.1938 (*Dr P. W. R. Petrie*); 2 ♂, 2 ♀, ix.-xi.1937 (*Dr C. Rathjens*) (BMNH).

Belonogaster adenensis somaliensis subsp. n.

FEMALE. Light ferruginous; sides or even the whole clypeus, yellow; mesosoma and gastral tergites 4-5, black. Wings yellow-brown, tips widely dark fuscous, length 20.0 mm.

MALE. Ferruginous; most of mandibles, face level of centre of ocular sinus except narrow central stripe on clypeus, streak beneath fore femur, most of mid coxa beneath, creamy white; mesosoma black, pronotum, scutellum and metanotum, mesosternum anteriorly, ferruginous; gaster ferruginous, tergites 3-4 black, transverse preapical spots of tergite and sternite 2, yellow. Wings reddish brown, tips widely black, length 18.0 mm.

Holotype ♀, **Somali Republic**: 1898 (*Miss P. Gillet*) (BMNH).

Paratypes. **Somali Republic**: 1 ♀, same data as holotype; 2 ♀, Hargeisa, iii.1949 (*K. M. Guichard*) (BMNH) (both with large rounded yellow spots before apex of tergite 2); 1 ♂, Erigavo, 20.iv.1952 (*E. J. van Ingen*) (BMNH); 1 ♂, 9 ♀, Afgoi, ix.1977 (*M. Olmi*) (BMNH); 1 ♀, unlocalized, 1881 (*C. Révoil*) (MNHN, Paris). **Ethiopia**: 2 ♀, unlocalized (*Schimper*) (MNHN, Paris).

Belonogaster filiformis (de Saussure)

(Fig. 78)

Raphigaster filiformis de Saussure, 1853: 18, pl. 2, fig. 4, LECTOTYPE ♀, SAUDI ARABIA ('Arabie, Djedda'): 1839 (*Botta*) (MNHN, Paris), here designated [examined].

Belonogaster filiformis (de Saussure) Kohl, 1894: 335.

There are 2 ♀ in MNHN, Paris from Saudi Arabia, both marked 'Type Djedda', and I have labelled one lectotype.

FEMALE. Light reddish brown; apex of gastral tergite 2 and sternite 2 with two transverse yellow spots. Wings yellow-brown with tips fuscous, length 19.0 mm.

The female seems not to be clearly distinguishable from that of *B. arabica* Giordani Soika (p. 96) but the distribution is rather different, the present species being more western. The males, however, differ in their antennae, that of *filiformis* having segment 12 shorter and more flattened and segments 10-11 more convex beneath; the mid and hind femora also have dense white recumbent pubescence beneath.

MALE. Light ferruginous; greater part of mandible, broad sides to clypeus, inner orbit to middle of ocular sinus, spot between antennal sockets, creamy white; traces of stripe beneath fore femur, traces of narrow transverse preapical spots on gastral tergite and sternite 2, yellow; narrow apical part of gastral tergite 2, black, tergites 3-4 sometimes darkened. Wings light brown, tips slightly darkened, length 17.0-18.5 mm.

Clypeus acute below, finely reticulate, not very dull, with scattered not very large punctures, with close silvery hairs, mainly on the sides and scattered short outstanding black bristles, mainly on the disk; frons dull, reticulate with sparse outstanding black bristles; gena not quite as wide as eye in profile, finely reticulate with scattered small punctures; apparently few bristles at base of submentum; antennal segment 3 a little longer than 4 + 5, 4 and 5 about 2.5 times as long as broad, 8 a little more than twice as long as broad, 12 (Fig. 78) about as long as 9, a little flattened and curved (even below), tip rounded, surface with a number of very short hairs, 10 and 11 with strong prominences beneath, 9 with a smaller prominence, apex of 5 beneath to 8 with raised lines. Mesoscutum and humeri finely reticulate with inconspicuous fine punctures and dense rather long pale tomentum, mesopleuron more distinctly punctured, scutellum with a central impressed line, it and especially metanotum more strongly punctured, propodeum quite strongly punctured with weak striae on angles, with dense fine tomentum and outstanding short, mainly black hairs. Last segment of fore tarsi elongate; mid and hind femur with dense white tomentum beneath. Gastral petiole rather long, not very slender, not much widened posteriorly, spiracles little protruding, surface rather dull with pale tomentum and very short hairs; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with close fine tomentum but no bristles.

DISTRIBUTION. **Saudi Arabia** (lectotype ♀ and paralectotype ♀, Jidda (MNHN, Paris), 1 ♀, At Ta'if, 12.vii.1934 (*H. St. J. B. Philby*), 3 ♀, 18.vi.1946 (*A. R. Waterston*), 1 ♀, between At Ta'if and Bisha, 24-25.vi.1962 (*G.*

Popov), 1 ♀, Mibrata, at foot of Asir escarpment, east of Jizan, 3000 ft [915 m], 3.xii.1936 (*H. St. J. B. Philby*), 1 ♀, 2 ♂, Abah, Asir, 8000 ft [2440 m], 22.viii.1944 (*A. R. Waterston*), 1 ♂, 1 ♀, Ktubu, 1902 (*G. W. Bary*) (BMNH).

Belonogaster tessmanni von Schulthess

Belonogaster tessmanni von Schulthess, 1910: 45. Syntypes ♂ ♀, GUINEA-BISSAU: 'Spanish Guinea, Helleborg, Benitogebiet, 1906-07' (MNHU, Berlin, EI, Zurich; not found).

This species was described by von Schulthess from a ♂ and at least 2 ♀ collected by G. Tessmann in Guinea-Bissau. At least one specimen was stated to be in the Berlin Museum, but MNHU, Berlin seem not to have it now. The other von Schulthess' types of *Belonogaster* are EI, Zürich but Professor W. Sauter tells me that though there is a space and a label for a specimen there, the actual syntype is absent—possibly lent to someone and not returned. Although the original description is quite detailed I have not been able to identify this species with any certainty, though it is probably distinct.

Descriptions of Malagasy species

Although I have included the one species from the Comoro Islands in the key to the continental African species, I am treating the Madagascan species separately. As far as I can make out, there are no species common to the two regions; most of the Madagascan species have a peculiar facies and several species have some part of the body blue-green, as do some of the wasps of genus *Ropalidia* Guérin-Méneville. Such a colour is otherwise unknown in social wasps. I suspect that the wasp fauna of Madagascar is very imperfectly known. Some species seem to be quite variable and perhaps if more specimens were available it would be possible to recognize more species.

Belonogaster brevipetiolata de Saussure

(Figs 79, 80)

Belonogaster brevipetiolatus de Saussure, 1891: 98, pl. 4, fig. 1. ? Syntypes 2 ♀, MADAGASCAR: unlocalized (MNHN, Paris) [examined].

These two females are said to have been determined by de Saussure and may indeed be syntypes but they have no locality data. The species was described from Fianarantsoa (pays des Betsileo), near Andrangoloakā (eastern limits of Imerinā province) and S. Coast, Nosibé. Judging by collections it is a relatively common species.

FEMALE. Dark blackish brown; head ferruginous, narrow dorsal area on clypeus, frons and vertex, underside of head, antennae, black. Wings light brownish hyaline, length 17.0–20.5 mm.

Clypeus acute below, dull, finely reticulate, a few quite large punctures on the lower quarter which also has a few pale bristles, surface generally with relatively long, appressed silvery hairs; frons dull, very finely granulate with some fine punctures bearing brown outstanding bristles in front, appressed pale hairs as on clypeus but shorter; gena not quite as wide as eye in profile, dull finely reticulate with scattered rather fine punctures, especially below; base of submentum and stipes with a number of moderately long brown, pale tipped bristles; antennal segment 3 much longer than 4 + 5, 4 and 5 a little longer than broad, 8 not quite as long as broad. Mesoscutum, humeri and mesopleuron dull, finely granulate with a moderate number of rather fine inconspicuous punctures with rather close brown tomentum, scutellum and metanotum rather more closely punctured, both with a smooth impressed line; propodeum dull, granulate, not very strongly punctate-striate above with pale brown tomentum, very few outstanding hairs, posterior depression one-quarter as long as propodeum, impressed line short and weak, anterior depression small but very deep. Last segment of fore tarsus short; hind femora with tomentum and a few short bristles beneath. Gastral petiole (Fig. 79) short (about as long as hind trochanter + femur), rather stout, widening very gradually to apex, spiracles moderately prominent; stalk of second gastral tergite half as long as broad, gaster posteriorly with very fine inconspicuous tomentum, no bristles.

MALE. Blackish brown, head ferruginous, frons, vertex and underside of head black; antennae black, segments 10–12 light brown; sides of clypeus and inner orbit somewhat whitish. Wings very light brownish hyaline, length 15.0 mm.

Mandibles broad, parallel-sided, dense pale hairs at base. Clypeus moderately transverse, scarcely at all produced below (angle *ca* 160°), dull, reticulate, a few scattered punctures and dense short silvery hairs; frons dull with close, moderately large punctures and quite long, outstanding pale brown bristles; OOL shorter than distance between outer edges of posterior ocelli; gena rather less than half the width of the eye in profile, dull, not punctured; base of stipes and submentum beneath with numerous rather short hairs; antenna (Fig. 80) with segment 3 a little shorter than 4 + 5, 4 and 5 2.5 times as long as broad, 8 a little more than twice as long as broad, segment 12 long, narrow cylindrical, rather strongly curved, tip rounded, many quite long hairs, the segment rather longer than 9, 10–11 cylindrical, 10 with apex emarginate beneath, no raised lines. Mesoscutum and humeri with numerous long outstanding hairs, a little shining, reticulate with numerous moderately large punctures, close brownish tomentum; mesopleuron similar; scutellum with practically no impressed line, it and metanotum like mesoscutum; propodeum dull, reticulate with scattered moderate punctures and rather sparse long fine hairs; posterior depression one-quarter as long as propodeum, no impressed line, anterior depression small but deep. Last segment of fore tarsus hardly shortened, hind femur beneath with dense rather short white hairs with a few longer protruding ones. Gastral petiole rather long and narrow, little widened posteriorly, spiracles strongly protruding; stalk of second tergite not quite as long as broad, gaster posteriorly with dense greyish pubescence and no bristles.

DISTRIBUTION (16 ♀, 11 ♂). Ambohinimbo Forest, Bay of Antongil, Betsileo, Fampanambo, Tamatave, Tananarivo.

In MNHN, Paris are 3 nests, the cells of which are arranged thread-like, hanging from a leaf. Two of them have jet-black stripes and the largest is 15.5 cm long.

Belonogaster guerini (de Saussure)

(Fig. 81)

Raphigaster guerini de Saussure, 1853: 17, pl. 2, fig. 3. ?Holotype ♀, MADAGASCAR (coll. Gribodo, apparently ex coll. Guérin-Ménéville) (MCSN, Genoa) [examined].

Belonogaster guerini (de Saussure) Smith, 1857: 94.

This species was described, apparently, from a single female in the collection of Guérin-Ménéville; this collection was dispersed on the death of its owner. A female in the Gribodo collection appears to be the holotype. The species is the largest in the genus and is, I think, peculiar to Madagascar; records by du Buysson (1909: 225) and Bequaert (1918: 332) from continental Africa or even from the Comoro Is., were probably based on other species. The long series in MNHN, Paris are all this species and all are from Madagascar.

Some specimens of *B. dubia* in early collections were identified as *B. guerini*, especially females in which the yellow stripes on the face are reduced. True *B. guerini* has a longer stalk to the second gastral sternite, no bristles on the gaster posteriorly, the sides of the propodeum finely granulate (not punctured) and the mesothorax generally more finely sculptured and less bristly.

FEMALE. Ferruginous; antennal segment 3 darkened dorsally. Wings light brown, length 28.0–29.5 mm.

Clypeus acute below, lower quarter finely reticulate, shining with many large punctures and brown bristles, upper three-quarters dull, very closely and finely punctured and reticulate with few large punctures and black bristles, almost no silvery tomentum; frons finely reticulate with scattered small punctures and outstanding black bristles, sparse silvery tomentum; gena almost as wide as eye in profile, finely reticulate, more shining below where there are scattered small punctures; base of submentum and stipes with rather short, stout black bristles; antenna with segment 3 distinctly longer than 4 + 5, 4 twice as long as broad, 5 rather shorter, 8 a little longer than broad. Mesoscutum finely but strongly reticulate, dull with numerous small punctures and sparse silvery tomentum, humeri and mesopleuron similar but with sparser reticulation and denser tomentum; scutellum and metanotum similar but more punctured, former with no impressed line; propodeum dull, finely reticulate, strong striae on angles with sparse white tomentum and no hairs, posterior depression one-third as long as propodeum, impressed line strong, complete, anterior depression very small. Last segment of fore tarsus elongate; femora beneath with pale tomentum and scattered short pale bristles. Gastral petiole not long, moderately stout and thickened posteriorly, spiracles moderately projecting, no hairs; stalks of second gastral tergite 2.5–3.5 times as long as broad; gaster posteriorly with very close white or pale brown tomentum, no protruding bristles.

MALE. Rather dark ferruginous; most of mandibles, wide sides of clypeus, inner orbits, spot above antennal

sockets, white. Antennae black, ferruginous beneath except on segment 12. Wings reddish brown, length 27·0 mm.

Mandibles broad, parallel-sided with 3 blunt teeth and dorsally a very broad straight-edged lobe. Clypeus not produced dorsally but with a feebly curved lower margin, sides with dense silvery hairs and whole surface with sparse black bristles; frons dull, very finely reticulate, on each side with a patch of rather small bristles bearing punctures; gena two-thirds as wide as eye in profile, finely reticulate, not punctured; antenna (Fig. 81) thinning to apex, segment 3 about as long as 4 + 5, 4 a little longer than 5, about 2·5 times as long as broad, 8 fully twice as long as broad, 12 moderately flattened, black, curved, slightly widened to apex, rounded truncate, shining beneath, a little longer than 11, 9–11 cylindrical with no projections beneath, 8–9 with very weak raised lines beneath. Thorax dull, very finely reticulate, with sparse pale tomentum, scarcely punctured except on scutellum, metanotum and mesopleuron where rather weakly and not very closely punctured; propodeum with very few punctures and some weak striae on lower half, posterior depression one-quarter as long as propodeum, impressed line weak but complete, anterior depression very transverse but quite deep. Last segment of fore tarsus elongate; fore and mid femora with rather long tomentum beneath, hind femur with weak tomentum beneath. Gastral petiole quite long, distinctly thickened on apical part; stalk of second gastral tergite rather less than twice as long as broad, gaster posteriorly with pale, not very dense tomentum and no protruding bristles.

DISTRIBUTION (22 ♀, 5 ♂). **Madagascar**: Antanambe, Bay of Antongil, Fort Dauphin, Diego-Suarez, Montagne d'Ambre, Nossi Bé, Tamatave, Vohémar.

A small nest collected by D'E. de Charmoy was long oval with 17 small cells and 12 long ones—up to 47·0 mm long. The peduncle was broken off. The carton was light brown and the cocoon was slightly domed over the cell.

Belonogaster madecassa (de Saussure)

(Figs 82, 83)

Raphigaster madecassus de Saussure, 1853: 16, pl 2, fig. 7. Holotype ♀, MADAGASCAR (coll. Gribodo, probably ex coll. Guérin-Méneville) (MCSN, Genoa) [examined].

Belonogaster madecassus (de Saussure) Smith, 1857: 94.

Belonogaster longestylus de Saussure, 1891: 97. LECTOTYPE ♀, MADAGASCAR (coll. de Saussure) (MHN, Geneva), here designated [examined]. **Syn. n.**

De Saussure described this species from a female in the collection of Guérin-Méneville on whose death the specimens were dispersed. It seems probable that a specimen in the Gribodo collection at Genoa which has been labelled 'lectoholotype' by Dr Giordani Soika is in fact the holotype. *B. longestylus* was thought by de Saussure to be very similar to *madecassa* but he gave it a new name because the type of *madecassa* was no longer available to him for comparison. The new name was founded on two females from Madagascar, one collected by Hildebrandt and in the MNHU, Berlin and there apparently missing, one collected by Sikora and in the Saussure collection. A female amongst the Saussure material in MHN, Geneva, labelled *longestylus*, may perhaps be a syntype; I have labelled it lectotype. It seems to be the same species as *madecassa* though it varies somewhat in colour and in length of the stalk of the second gastral tergite. The specimens in MNHN, Paris were labelled by du Buysson '*hildebrandti*' but they differ from the description of that species.

FEMALE. Yellowish ferruginous, gaster blackish ferruginous, sometimes with traces of yellow apical bands produced up along the sides on tergites 2–4; head except frons and antennae yellowish. Fore coxa yellow beneath. Wings very pale brown, tip concolorous, length 13·0–14·0 mm.

Clypeus acute below, finely reticulate with scattered small punctures, pubescence inconspicuous; frons duller, not obviously punctured with very short hairs; gena about two-thirds as wide as eye in profile, a little shining, finely reticulate; base of submentum and stipes without outstanding bristles; antennal segment 3 much longer than 4 + 5, 4 and 5 rather less than 1·5 times as long as broad, 8 a little longer than broad. Thorax finely granulate with inconspicuous pale tomentum, mesopleuron weakly punctured; propodeum granulate, no punctures or striae but silvery tomentum and short outstanding hairs, posterior depression not quite half as long as propodeum, impressed line very weak, anterior depression almost obsolete. Last segment of fore tarsi rather short, mid and hind femora with a few short pale bristles beneath. Gastral petiole

(Fig. 82) rather long, a little thickened posteriorly, with long and moderately dense hairs beneath, spiracles little protruding; stalk of second gastral tergite 3.5–4.0 times as long as broad, gaster posteriorly with rather dense pale tomentum but no protruding bristles.

MALE. Yellowish ferruginous, head yellow beneath; legs and gaster beneath rather yellower. Wings almost hyaline, length 11.0 mm.

Clypeus gently curved below, surface dull with rather long moderately dense white hairs; mandibles with 4 small apical teeth; eyes much closer at the clypeus than at the ocelli, somewhat swollen below; frons duller with quite dense pale hairs; gena rather less than half as wide as eye in profile, rather retreating, a little shining; antennae (Fig. 83) thin, spirally rolled, segment 3 about as long as 4 + 5, 4 and 5 about 3 times as long as broad, 8 a little more than twice as long as broad, 12 short, not quite as long as 8 flattened, a little widened to apex with a few hairs, tip narrowly black 8–11 with a flat protruding area beneath. Thorax very finely granulate, not punctured, with fine pale but not dense tomentum; propodeum finely granulate with pale hairs, posterior depression not quite half as long as propodeum, impressed line weak, anterior depression very weak. Fore tarsi a little shortened, mid tarsi distinctly shortened and widened; femora beneath with only pale tomentum. Gastral petiole not very long; a little thickened posteriorly, stalk of second gastral tergite 4.5 times as long as broad, gaster posteriorly with fine pale tomentum but no bristles.

DISTRIBUTION (26 ♀, 1 ♂). **Madagascar:** Baie d'Ampasindava (Pointe d'Ankify), Diego-Suarez, Joffreville, Valley of Fanjahira, Isaka, Fort Dauphin, Tamatave, Ste. Marie de Madagascar, Vohémar.

Belonogaster keiseri sp. n.

(Fig. 84)

MALE. Head light ferruginous; malar space and gena, ocular sinus, pale yellow; clypeus and supraclypeal area, greater proximal part of mandibles, blackish, central stripe of clypeus and supraclypeal area brown; antenna light ferruginous, segments 1–2 and base of 3 a little blackened, 9–12 a little yellowish, distal quarter of 12 blackened. Mesosoma ferruginous, band across pronotal keel, lateral sclerites of scutellum, most of metanotum, valves and large posterior area of propodeum, posteroventral mesopleural spot, pale yellow; anterior margin of propodeum narrowly blackened. Legs blackish brown, fore tibia and tarsus blacker, fore coxa posteriorly, fore femur with dorsal and posterior streak, anterior streak of mid femur, anterior streak of mid tibia and tarsus, creamy yellow. Gaster blackish ferruginous. Wings hyaline, venation pale ferruginous, length 11.5 mm.

Mandibles parallel-sided with four teeth, dorsal one a little shorter; clypeus nearly flat, distinctly projecting below in an obtuse, more or less rounded angle, dull, finely reticulate with a few obsolescent punctures with short dense outstanding white hairs, a little denser at sides below; supraclypeal area transversely convex centrally with a shallow furrow on each side; frons slightly convex on each side and depressed in centre, dull, finely reticulate with some silvery tomentum and sparse outstanding hairs; gena strongly receding with no margin, a little less than half as wide as eye in profile; antenna with segment 3 much longer than 1 + 2 but not quite as long as 4 + 5, 4 and 5 3.5 times as long as broad or nearly so, 8 a little more than 2.5 times as long as broad, 9–12 considerably longer and thinner, 12 narrow, considerably flattened and curved, as long as 11 which is cylindrical, distal part of 5 and 6–10 beneath with raised lines, stronger on 9–10; segments dull with fine tomentum, rounded tip of 12 shining. Mesosoma dull, finely granulate, not punctured, with fairly close silvery tomentum, dorsally with moderately long not very close outstanding hairs; posterior depression of propodeum not quite half as long as propodeum, impressed line weak, anterior depression transverse, shallow. Tarsi (Fig. 84) with fore pair moderately elongate, distal segments of mid pair shortened, hind pair very elongate; femora with short rather close white hairs beneath. Gastral petiole long and slender, little widened posteriorly, spiracles little protruding, shining with rather numerous longish hairs beneath; stalk of second gastral tergite 4 times as long as broad, posterior tergites finely reticulate, a little shining with rather inconspicuous brownish tomentum.

FEMALE. Not seen.

Holotype ♂, **Madagascar:** Diego-Suarez, Joffreville, 25.v.1958 (*F. Keiser*) (RNH, Leiden).

Belonogaster bicolor de Saussure

Belonogaster bicolor de Saussure, 1900: 207, 208. LECTOTYPE ♀, MADAGASCAR (MHN, Geneva), here designated [examined].

This species was described from an unknown number of females collected by Voeltzkow in Madagascar. It is not clear where the material was deposited but a female under the name *bicolor* at Geneva seems to be part of de Saussure's material and is here made lectotype.

FEMALE. Head light ferruginous, antennal scape greenish black. Mesosoma light ferruginous, proepisternum ferruginous, coxa, trochanter and femur greenish black; mid and hind coxae, trochanters and femora greenish black; fore tibia greenish, all other tibiae and all tarsi light yellowish brown. Gaster black, tergites and sternites 2–6 progressively more reddish. Wings light brownish hyaline, length 20.0–22.0 mm.

Clypeus acute below, lower quarter shining with close large punctures and short pale bristles, upper part duller with close granulation and sparse pale tomentum; frons dull, granulate with small punctures bearing black outstanding bristles in front, tomentum white, not dense; gena a little more than half as wide as eye in profile, dull, granulate, unpunctured except on malar space which is more shiny; base of submentum and stipes with dense long, black bristles; antennal segment 3 much longer than 4 + 5, 4 more than 1.5 times, 5 less than 1.5 times as long as broad, 8 distinctly less than 1.5 times as long as broad. Mesoscutum and humeri dull, coarsely granulate, unpunctured with short, not very close, outstanding black hairs; mesopleuron with some sparse, shallow punctures; scutellum and metanotum granulate with a few weak punctures, former with a short raised line in front; propodeum granulate with traces of striae below with sparse white tomentum and moderately numerous, long black hairs; posterior depression half as long as propodeum, impressed line strong, complete, anterior depression small, deep. Fore tarsus with fifth segment elongate; hind femur with dense tomentum and many rather long black and white bristles beneath. Gastral petiole rather long, distinctly thickened on apical third, many long hairs on basal half, spiracles moderately protruding; stalk of second gastral tergite 3.5–4.0 times as long as broad, gaster posteriorly with dense silvery tomentum but no bristles. The stalk is a little shorter than in *B. prasina*.

MALE. Not seen.

DISTRIBUTION. **Madagascar:** 2 ♀ including lectotype (one Saussure coll., other coll. by *Sikora*) (MHN, Geneva); 1 ♀, Nossi Bé (Saussure coll.) 1 ♀, unlocalized (BMNH); 1 ♀, Tananarive (RNH, Leiden); 1 ♀, Mont d'Ambu, 1904 (*Bourgoin*) (MNHN, Paris).

Belonogaster apicalis de Saussure

(Figs 85, 86)

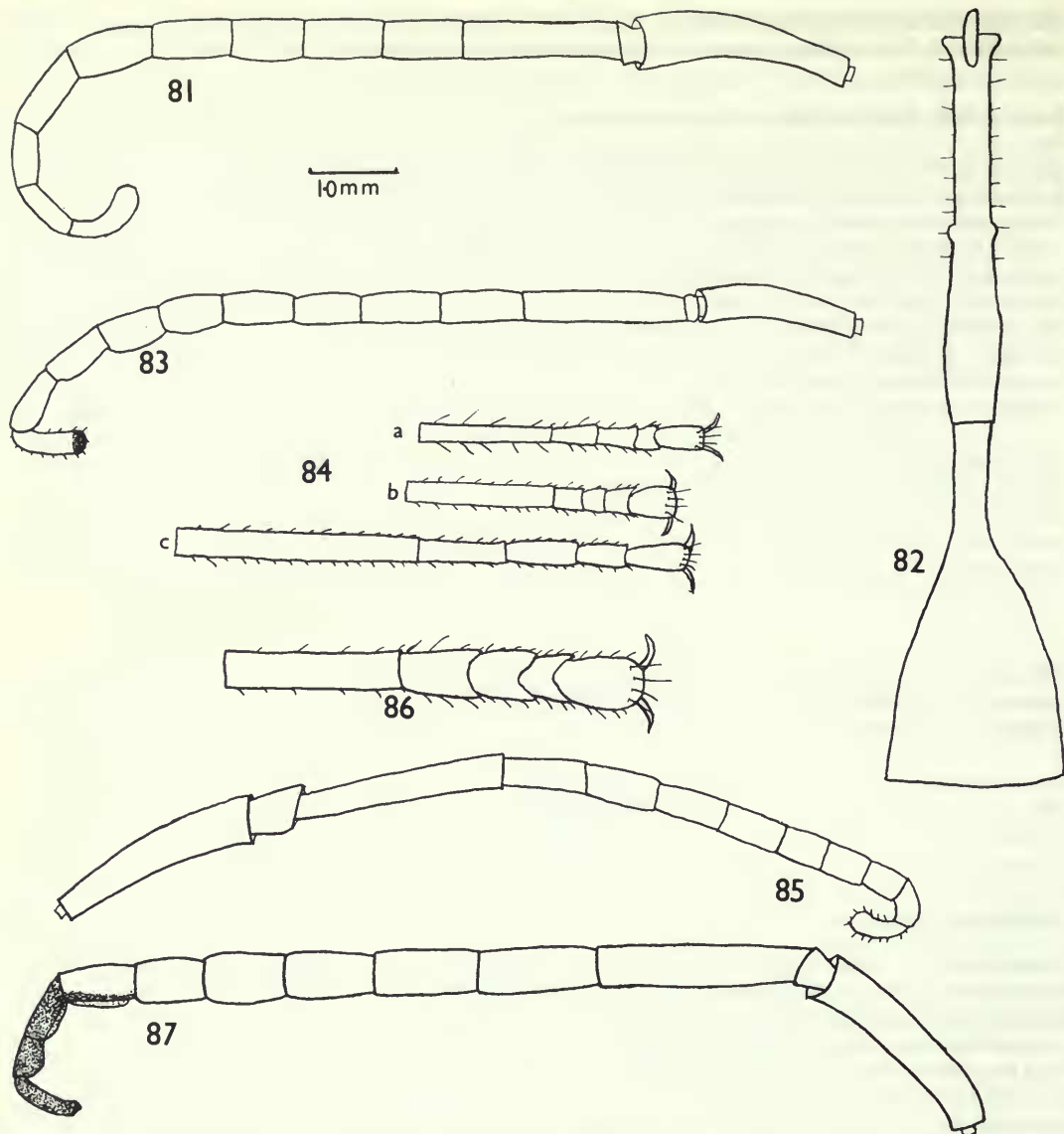
Belonogaster apicalis de Saussure, 1900: 207, 208. LECTOTYPE ♀, MADAGASCAR (MHN, Geneva), here designated [examined].

FEMALE. Black; mandibles pitchy; ventral quarter of clypeus dark ferruginous; antenna ferruginous, segments 1 and 2–3 above, blackened; tarsi more or less reddened. Stalk of second gastral tergite more or less ferruginous. Wings dark grey, large tips light red-brown, length 18.5 mm.

Mandibles with four teeth, dorsal one very short; clypeus acute below, lower quarter shining with close large punctures, above dull, closely granulate with close brownish tomentum and long outstanding brown, hair-like bristles; frons closely granulate with close brownish tomentum and outstanding blackish hairs; gena slightly more than half as broad as eye in profile, with close brownish pale tomentum and below granulate with some small punctures. Antenna with segment 3 distinctly longer than 4 + 5, 4 about 1.75 as long as broad, 5 less than 1.5 times as long as broad, 8 just longer than broad. Mesoscutum and humeri dull, finely granulate, no punctures, apparently brownish tomentum and outstanding brown hairs; scutellum with no mid line, it and metanotum like the mesoscutum; mesopleuron granulate with indistinct punctures; propodeum very closely and strongly reticulate (almost punctured) with tomentum and outstanding hairs, posterior depression one-third as long as propodeum, impressed line very weak, anterior depression almost obsolete. Fifth segment of fore tarsus elongate; hairs beneath fore coxa mainly pale; mid and hind femora beneath with close tomentum and short outstanding hairs. Gastral petiole rather long, base rather narrow, apex considerably widened, spiracles moderately protruding; stalk of second gastral tergite three times as long as broad; gaster posteriorly with close fine tomentum.

MALE. Ferruginous; antennal segment 1 and 9–12 more or less darkened; frons sometimes black; gena sometimes darkened. Mesoscutum a little darkened. Mid femur dorsally and posteriorly and hind femur blackened. Gaster dark ferruginous to black, stalk of second gastral tergite paler ferruginous. Mandibles (base sometimes black), clypeus except central stripe, inner orbits, spot between the antennal sockets, white; ventral margin of clypeus pitchy or black. Wings light brownish, length 19.0–20.0 mm.

Mandibles parallel-sided, dorsal tooth very short. Clypeus obtusely projecting below, tip just rounded,



Figs 81–87 *Belogaster*. 81, *B. guerini* (de Saussure), ♂, left antenna. 82, 83, *B. madecassa* (de Saussure). (82) ♀, gastral tergites 1–2; (83) ♂, left antenna. 84, *B. keiseri* sp. n., ♂, fore (a), mid (b) and hind (c) tarsus. 85, 86, *B. apicalis* de Saussure, ♂. (85) left antenna; (86) fore tarsus. 87, *B. prasina* de Saussure, ♂, left antenna.

slightly transversely convex, very finely reticulate, slightly shining, some black bristles on central stripe, tentorial pits prominent, subantennal plate rather prominent with sides well defined; mandibles bare except for a small patch of short silvery hairs, sides of clypeus with moderately long outstanding silvery hairs; frons dull, reticulate with a few outstanding brown hairs; eyes a little swollen, gena receding about one-third of width of eye in profile. Antenna (Fig. 85) with segment 3 just longer than 1, about 6 times as long as broad, a little longer than 4 + 5, 4 a little more than, 5 a little less than 2.5 times as long as broad, 8 just more than twice as long as broad, 12 with fine hairs, moderately shining, a little flattened, slightly curved, end rounded truncate, about as long as 10, 11 somewhat thinner than 10, 10 a little thinner than 9, 10 and 11 with a raised shining line beneath, 6–9 with a raised line beneath. Humeri and mesoscutum dull, finely reticulate with a few indistinct punctures; humeri with not very dense oblique brownish bristles and quite dense silvery

tomentum, mesoscutum with fairly close short pale brown tomentum; scutellum and metanotum with some short outstanding black bristles; propodeum dull, reticulate with silvery tomentum and short hairs; posterior depression shallow, one-third as long as propodeum, impressed line weak or in second male strong, anterior depression almost obsolete. Mesosternum and coxae with pale tomentum and hairs; fore tarsus (Fig. 86) with last segment rather short and broad, mid tarsus rather less so; femora beneath with close silvery tomentum but no bristles. Gastral petiole moderately long, basally narrow but part behind spiracles rather broad, with silvery tomentum and short hairs beneath, spiracles moderately protruding; stalk of second gastral tergite 2.5 times as long as broad, gaster posteriorly with fine pale tomentum but no bristles; last sternite obtusangularly emarginate with a fringe of brownish bristles.

DISTRIBUTION. **Madagascar:** lectotype ♀ (MHN, Geneva) (not in good condition); 2 ♂, Tananarivo (RNH, Leiden).

Belonogaster prasina de Saussure

(Figs 87–89)

Belonogaster prasinus de Saussure, 1891: 92, pl. 19, fig. 5. **LECTOTYPE** ♂, **MADAGASCAR** (*Scott-Elliott*) (coll. de Saussure, MHN, Geneva), here designated [examined].

This species was described from Madagascar: 'forêts à l'est de l'Antsihanaka' (1 ♀ coll. Oberthür), Nossi Bé (variety), and several of both sexes collected in the environs of Fort Dauphin by Scott-Elliott (coll. de Saussure). There are in MNHN, Paris 5 ♂ collected by Scott-Elliott, three of which are labelled *prasinus*; one of these has been labelled lectotype.

FEMALE. Head yellow, large spot on dorsal half of clypeus, spot between antennal sockets, frons, blue-green. Pronotum dorsally blue-green, front and lower angles, yellow; front of mesoscutum with a blue-green patch on either side, mesosoma otherwise yellow or yellow-brown. Legs yellow to yellow-brown with mid and hind femora mainly blue-green. Gaster yellow-brown, petiole, basal two-thirds of second tergite, small basal area on tergites 3 and 4, basal two-thirds of sternite 2, blue-green. Wings yellowish hyaline, length 16.5–21.0 mm, mean (24 specimens) 19.0 mm.

Mandibles not specially broad; clypeus acute below, ventral half especially but the whole with moderate-sized punctures and scattered pale bristles, moderately shining, very fine reticulate, sparse pale tomentum; frons dull, finely granulate, punctures hardly discernible, some outstanding white hairs; gena about two-thirds as wide as eye in profile, slightly shining, very finely reticulate with scattered fine punctures below; base of submentum and stipes with a few pale bristles; antenna with segment 3 a little longer than 4 + 5, 4 nearly 1.5 times as long as broad, 5 nearly 1.25 times, 8 just longer than broad. Mesoscutum and humeri rather finely granulate, no punctures, sparse white tomentum; mesopleuron with scattered small punctures and sparse pale tomentum; scutellum and metanotum dull, granulate with weak punctures, former with a weak impressed line on posterior half; propodeum hardly punctured, striate, especially below, numerous short pale hairs and a little pale tomentum, posterior depression one-third as long as propodeum, impressed line strong and complete, anterior depression very small, deep. Proepisternum and fore coxae with white bristles; last segment of fore tarsi hardly shortened; hind femur with pale tomentum and scattered not very long pale hairs beneath. Gastral petiole (Fig. 89) long, distinctly widened on apical third, spiracles not prominent, hairs on basal half rather short and not very numerous; stalk of second gastral tergite 3 times as long as broad; gaster posteriorly with not very dense white tomentum but no bristles.

MALE. Head yellow, antennae more orange, with segments 10–12 black, 7–9 partly black beneath; frons in large central area blue-green, mesosoma yellow, humeri, part of mesoscutum, scutellum, faint cloud on propodeum, blue-green. Legs pale yellow-brown, hind femora a little darker, fore tarsi whitish, darkened blackish above. Gaster light yellow-brown, petiole with basal three-quarters, segment 2, base of tergites 3–4, blue-green. Wings yellow-brown hyaline, length 17.5–18.0 mm.

Mandibles moderately broad with white tomentum on basal half; clypeus (Fig. 88) gently rounded below, protruding a little beyond the lateral lobes, sides and orbits whitened with dense silvery tomentum, surface dull, rather flattened, hardly punctured; frons finely granulate, hardly punctured, a moderate number of outstanding white hairs; gena one-third as wide as eye in profile, dull, very finely granulate, not punctured; antennal (Fig. 87) segment 3 nearly as long as 4 + 5, 4 short, longer than, 5 just shorter than 2.5 times as long as broad, 8 2.5 times as long as broad, 12 shining black, a little curved, hardly flattened, about as long as 10, end rounded, a few very short hairs, 10 and especially 11 with an elongate hump beneath, 9 with a raised line beneath, 6–8 with weak raised lines. Mesoscutum and humeri dull, finely granulate, not punctured, rather sparse pale tomentum, humeri with some very short outstanding hairs; mesopleuron similar;

scutellum and metanotum with some very weak punctures, former with a weak central line; propodeum dull, finely granulate, some very weak striae below, sparse tomentum and moderately numerous outstanding short pale hairs, posterior depression not quite half as long as propodeum, impressed line strong, complete, anterior depression very small, deep. Proepisternum and fore coxae with silvery hairs; fore and mid tarsi distinctly short and broad; hind femur with weak tomentum and no bristles beneath. Gastral petiole long, distinctly widened in posterior third, spiracles a little projecting, basal half with numerous very short hairs; stalk of second gastral tergite 3 times as long as broad; posterior part of gaster with close fine yellowish tomentum but no bristles.

DISTRIBUTION. Madagascar: 5 ♂ (including lectotype), near Fort Dauphin, (Scott-Elliott); 1 ♀, 'Madagascar' (Sikora); 1 ♀ (no other data) (MHN, Geneva); 1 ♀, Joffreville, 11.v.1958 (F. Keiser); 1 ♀, Tam [?atave], Perinet, 13.iv.1958 (F. Keiser) (RNH, Leiden); 1 ♀, east, near Fort Dauphin, 1901 (Alluaud); 1 ♀, Valley of Ambolo, Col of Sakavalana, 1901 (Alluaud); 2 ♀, Isle Sainte Marie, 1898 (R. Oberthür); 3 ♀, Bay of Antongil, 1898 (A. Moquerys); 1 ♀, Légon, 1903 (MNHN, Paris); 1 ♂, Fort Dauphin, 1891; 1 ♂, Ft Dauphin 500 m, 15.iv.1968 (K. M. Guichard); 1 ♂, Fort Dauphin, Mandena, 100 m, 14–18.iv.1968 (K. M. Guichard, P. Dechappe); 13 ♀, Tulear Province, Zombitsy Forest, 300 m, 22.iii.1968 (K. M. Guichard, P. Dechappe); 1 ♀, Valley of Sambirano, 1934 (Mellis) (BMNH).

The species varies considerably in the extent and the shade of the blue-green markings. It also varies in size; the 9 ♀ in MNHN, Paris have wing-length 17.0–21.0, mean 19.1 mm, whereas the 15 ♀ in BMNH have wing-length 16.5–20.0, mean 18.8 mm.

There are two females in MNHN, Paris in bad condition, one headless, which were apparently identified by du Buysson as *B. longestylus*, though they do not at all agree with the original description. They seem to be a form of *B. prasina*, though the stalk of the second gastral tergite is rather longer compared with its width and the background colour is blackish brown rather than yellow-brown.

Belonogaster maromandia sp. n.

FEMALE. Ferruginous; frons, sometimes gena dorsally, thorax usually more or less, gastral petiole and stalk of second tergite, sometimes some suffusion of gaster posteriorly, coxae and femora (more or less), blackened, the black somewhat greenish especially on gena, pronotum and pleuron. Wings reddish brown, tips if anything, paler, length 16.5 mm.

Mandibles with three acute ventral teeth and a much shorter and blunter dorsal one; clypeus acute below, surface dull, finely reticulate with moderately close and large punctures, mainly on disk, bearing short brown or paler bristles, rather dense whitish tomentum; frons dull, finely reticulate with sparse fine punctures and on disk short outstanding brown bristles and whitish tomentum; gena slightly more than half as wide as eye in profile, dull reticulate, margin weak; antennal segment 3 a little longer than 4 + 5, 4 nearly twice, 5 rather more than 1.5 times as long as broad, 8 rather longer than broad. Mesoscutum dull, reticulate, with sparse fine punctures, especially at sides, and fine close brown tomentum; humeri and mesopleuron similar but punctures more numerous and tomentum paler; scutellum and metanotum with numerous punctures and short outstanding bristles; propodeum dull, strongly reticulate, a few striae on the angles, especially ventrally, with close pale tomentum and not very close outstanding brown bristles, posterior depression rather less than half as long as propodeum, impressed line strong to mid point, anterior depression weak, transverse. Last segment of fore tarsus elongate; longer bristles of fore coxa and mesosternum light brown; mid and hind femora with short white bristles and whitish tomentum beneath. Gastral petiole rather long, slender, spiracles little prominent, distal part a little widened but slightly narrowed to apex, tomentum close and pale, short outstanding hairs numerous; stalk of second gastral tergite nearly 3 times as long as broad, gaster posteriorly with close pale tomentum and short obliquely projecting pale bristles.

MALE. Not seen.

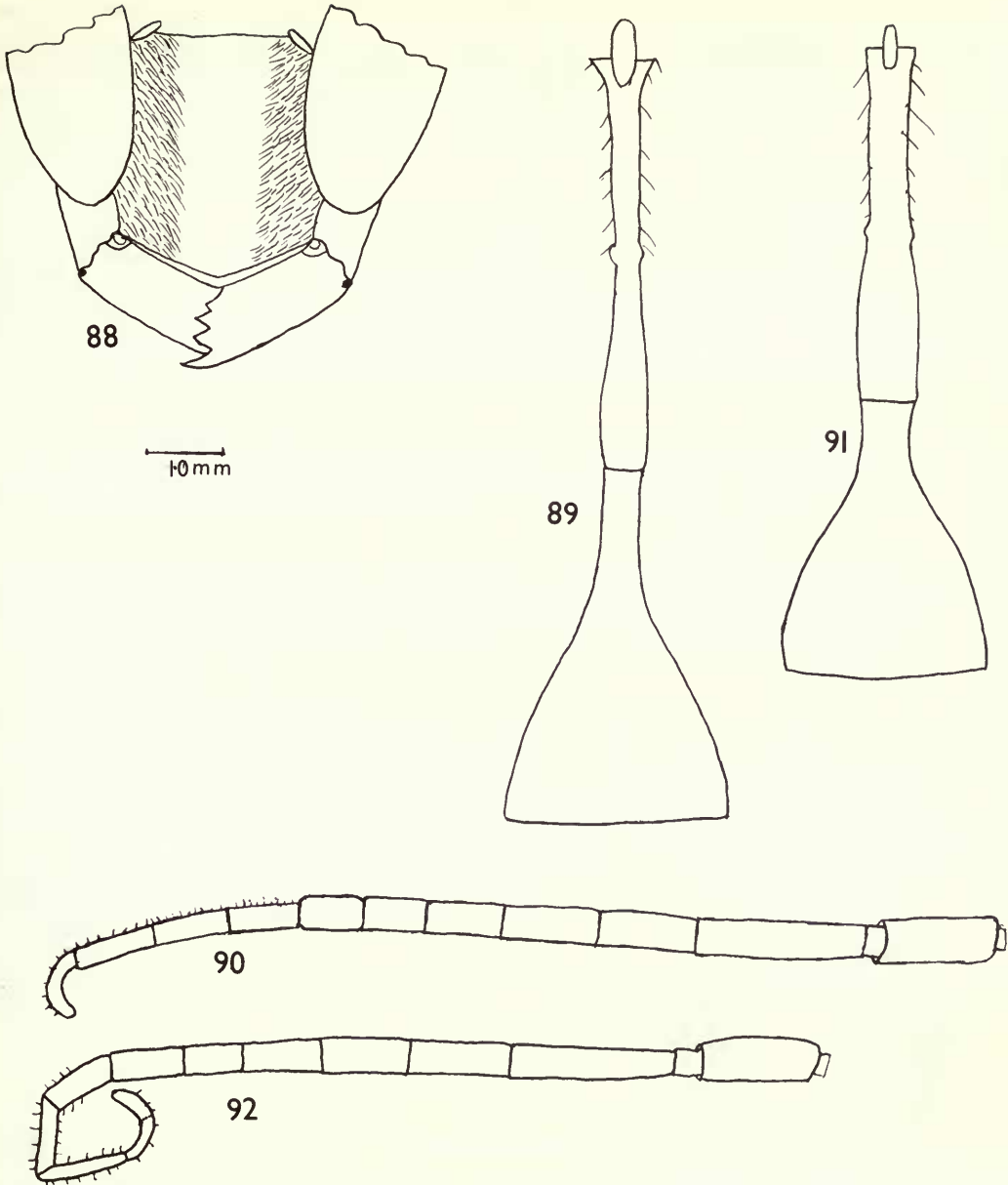
Holotype ♀, **Madagascar:** Province de Amalalava, Maromandia, 1923 (Decary) (MNHN, Paris).

Paratype. 1 ♀ with same data.

Belonogaster hildebrandti de Saussure

(Fig. 90)

Belonogaster hildebrandti de Saussure, 1891: 95, pl. 17, fig. 11. LECTOTYPE ♀, MADAGASCAR (MNHU, Berlin), here designated [examined].



Figs 88–92 *Belonogaster*. 88, 89, *B. prasina* de Saussure. (88) ♂, clypeus; (89) ♀, gastral tergites 1–2. 90, *B. hildebrandti* de Saussure, ♂, left antenna. 91, 92, *B. eumenoides* de Saussure. (91) ♀, gastral tergites 1–2; (92) ♂, left antenna.

This species was described from male and female specimens in MNHU, Berlin collected in the central region of Madagascar. In MNHU under this name are 2 ♂, 2 ♀ labelled Madagascar. The males are in very bad condition and I have labelled one of the females as lectotype. The only other specimens I have seen are 1 ♂, 1 ♀ in BMNH; the specimens under this name in MNHN, Paris, do not agree with the description and seem to me to be *B. madecassa*.

FEMALE. Head ferruginous, mandibles, ventral third and sides of clypeus, malar space, yellow or yellow-tinged; frons, scape and antennal segments 2–9 above, black. Mesosoma yellowish ferruginous, humeri

except front margin, mesoscutum, dorsal side of propodeum, blackish. Fore coxae yellowish, mid coxae blackish ferruginous, hind coxae black; femora black, tip of front pair yellow; tibiae yellow, hind pair narrowly black at apex; fore and mid tarsi dark ferruginous, hind tarsi black. Gaster with petiole, anterior two-thirds of tergite 2, small basal area of tergites 3–5, black, the rest yellow but the yellow of 3–5 narrowly interrupted near apex; sternite 2 with base dark. Wings pale reddish brown, length 12.0 mm.

Clypeus acute below, surface finely reticulate and apparently with many large punctures and dense moderately long, pale hairs; frons granulate without punctures or outstanding bristles; gena half as wide as eye in profile, shining, finely reticulate, not punctured; antennal segment 3 distinctly longer than 4 + 5, 4 1.5 times as long as broad, 5 rather less, 8 just longer than quadrate. Mesoscutum dull granulate, not punctured, short pale rather dense tomentum, mesopleuron, scutellum and metanotum similar; propodeum dull, granulate with dense long pale tomentum and some outstanding pale hairs, no punctures or striae, posterior depression one-third as long as propodeum, no impressed line, anterior depression very small. Last segment of fore tarsi elongate; femora with a few pale bristles beneath. Gastral petiole long, rather narrow, little widened at apex, spiracles little projecting, numerous appressed and some outstanding hairs; stalk of second gastral tergite about twice as long as broad, gaster posteriorly with fairly close pale tomentum but no bristles.

MALE. Light ferruginous; mandibles, wide sides of clypeus, spot between antennal sockets, upper orbits, white; stripes on coxae, femora and tibiae more or less whitish; propodeal valves whitish; second gastral tergite with sides and apex rather narrowly whitish, 3–4 similar but much less distinctly, sternite 2 with a whitish apical band. Mid tibia and tarsi darkened, hind tarsi and dorsal side of hind tibiae black. Wings hyaline, venation brown, length 12.0 mm.

Mandibles parallel-sided with three acute teeth and a much shorter dorsal one; clypeus obtusely and not very much protruding, almost a little truncate, surface dull, very finely granulate, base of mandibles and sides of clypeus with short outstanding white hairs; anterior tentorial pits and sides of subantennal area rather distinct; frons granulate with some outstanding hairs and silvery tomentum; eyes a little swollen, gena hardly one-third as wide as eye in profile, finely reticulate; antenna (Fig. 90) with segment 3 a very little shorter than 4 + 5, 4 nearly 4 times as long as broad, 5 rather shorter, 8 nearly 2.5 times as long as broad, 9–12 somewhat more slender, 12 subcylindrical, slightly curved, end rounded, about as long as 11, 8–12 shining beneath, no segment projecting. Mesoscutum and humeri finely granulate, very indistinctly punctured, with long pale brown tomentum; propodeum granulate with not very close pale tomentum and short outstanding pale hairs below; posterior depression nearly half as long as propodeum, impressed line hardly developed, anterior depression very small. Last segment of fore and mid tarsus a little widened; mid and hind tibiae with a little tomentum but very few hairs beneath. Gastral petiole rather long and slender, spiracles a little projecting, petiole little widened posteriorly, a little tomentum and some short outstanding hairs; stalk of second gastral tergite a little more than twice as long as broad; gaster posteriorly with close silvery tomentum and no bristles.

DISTRIBUTION. **Madagascar:** 2 ♂, 2 ♀ (including the ♀ lectotype) (MNHU, Berlin); 1 ♂, 1 ♀, **Betsileo**, 1882 (*Rev. W. D. Cowan*) (BMNH).

Belonogaster eumenoides de Saussure

(Figs 91, 92)

Belonogaster eumenoides de Saussure, 1891: 94. **LECTOTYPE** ♀, **MADAGASCAR**, Andrangoloakā (MHN, Geneva), here designated [examined].

?*Belonogaster pomicolor* de Saussure, 1900: 209. Syntypes ♂ ♀, **MADAGASCAR** (not located).

?*Belonogaster ornatus* de Saussure, 1900: 209. Syntypes ♂ ♀, **MADAGASCAR** (not located).

?*Belonogaster malagassus* de Saussure, 1900: 210. Syntypes ♂ **MADAGASCAR**: Nossi Bé (not located).

FEMALE. Colour variable. Dark ferruginous; mandibles and face sometimes yellow; propodeal valves yellowish; antennal segments 1–2, legs more or less, gaster, blackened, gastral petiole black. Wings very pale fuscous, length 12.5–15.0 mm. *Or* black, mandibles, malar space, face below antennal sockets, ocular sinus, yellow; antennal segments 3–11 and gena, ferruginous; pleuron, sternum, side of propodeum more or less, fore tarsi, ferruginous; large base of gastral petiole, base of stalk of second tergite, blue-green. Wings light brown, length 11.5–12.0 mm. Two further females are almost entirely ferruginous, wing-length 12.5–14.5 mm, stalk of second gastral tergite unusually short, 1–2 times as long as broad.

Mandibles parallel-sided with acute teeth; clypeus acute below, finely reticulate, lower third more shining with large punctures, scattered brown bristles and fine pale tomentum; frons granulate, some indistinct punctures, many short brown outstanding bristles; gena a little more than half as wide as eye in profile, dull,

finely reticulate; base of submentum and stipes with a few long bristles; antenna with segment 3 much longer than 4 + 5, 4 not quite 1.5 times as long as broad, 5 about 1.25 times as long as broad, 8 quadrate. Mesoscutum, humeri and mesopleuron finely granulate with numerous small shallow punctures and fairly close pale tomentum; scutellum and metanotum similar but without punctures, former with an impressed line on front half; propodeum granulate with some weak striae on angles, close pale tomentum and numerous pale outstanding hairs, posterior depression one-quarter as long as propodeum, impressed line short but strong, anterior depression scarcely developed. Last segment of fore tarsus short, femora beneath with rather close tomentum but no bristles. Gastral petiole (Fig. 91) rather long and narrow, little widened posteriorly, spiracles not projecting, with sparse tomentum and no bristles; stalk of second tergite usually 2.5 times as long as broad, gaster posteriorly with close pale tomentum but no bristles.

MALE. Light ferruginous-brown, mandibles, malar space, narrow genal streak next to eye, wide stripes from centre of ocular sinus to bottom of clypeus, whitish yellow; spot between antennal sockets, antennal segments 1–2, basicostal plate, anterior streaks on fore and mid femur, anterior streak on all tibiae, narrow end and sides of tergite 2, narrow end of sternite 2, broad streaks beneath coxae, meso-metasternum broadly, ventral points of pronotum, creamy white; mid and hind tibiae blackish brown above. Wings light brown, length 12.0 mm.

Structurally like the ♀; antenna (Fig. 92) with segment 12 long, narrow, cylindrical, curved, with a trace of a division rather before the middle, as long as segment, 9, 6–10 with a feeble raised line beneath, 9–11 not shining beneath; few punctures at sides of mesoscutum, many on mesopleuron. Gastral petiole less widened posteriorly than in *B. hildebrandti*, stalk of second tergite twice as long as broad.

DISTRIBUTION. **Madagascar:** 7 ♀ (including lectotype), 1 ♂, Andragoloakã (MHN, Geneva); 4 ♀, Annanarivo (MHN); 16 ♀, Betsileo (*Rev. W. D. Cowan*) (BMNH); 1 ♀, Fort Dauphin, Mandena, 100 m, 14–18.iv.1968 (*K. M. Guichard, P. Dechappe*); 1 ♀, Fort Dauphin, 500 m, 15.iv.1968 (*K. M. Guichard*) (BMNH); 1 ♂, 1 ♀, 'Madagascar', (de Saussure coll.) (MNHN, Paris); 1 ♀, Antanambe; 4 ♀, Nossibé, 12.iii.1952 (*V. J. Tipton*) (USNM, Washington).

Two further females from Madagascar: Fort Dauphin, v.1937 (*A. Seyrig*) (MNHN, Paris), described below, are perhaps a form of this species.

FEMALE. Light ferruginous, face and lower gena yellowish, scape and frons greenish black; humeri, mesoscutum, dorsal area on propodeum, greenish black; fore leg with femur and tibia green; basitarsus black; mid and hind legs green, tarsi with segments 2 or 3 to 5 ferruginous. Gaster with petiole and stalk of second tergite green, gaster posteriorly blackish, tergite 2 preapically with two almost joining comma-shaped, pale yellow spots; apical part of tergites 3–4 and whole of 5–6, ferruginous. Wings hyaline, venation ferruginous, length 12.0 mm.

Structurally similar, but stalk of second gastral tergite only twice as long as broad. Thoracic sculpture rather weaker.

There are in the MNHN, Paris, two small nests of the usual type from Tamatave, associated with this species.

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Index

Invalid names are in *italics*; principal references are in **bold**.

- abyssinica du Buysson 40, 44, 45, 95, **96**
 acaulis sp. n. 34, 57, **61**
 adenensis Giordani Soika 40, 46, **98, 99**
agilis Kohl 72
 apicalis de Saussure 47, **105**, 106
 arabica Giordani Soika 40, 45, 95, **96, 99**
 atrata von Schulthess 34, **59**
 aurata sp. n. 34, 57, **59**
- barbata sp. n. 39, 91, **92**
 bicolor de Saussure 47, **104**
 bimaculata sp. n. 37, 45, **78, 79**
brachycerus Kohl
 brachystoma Kohl 39, 41, **68**
braunsii Kohl 88
 brevipetiolata de Saussure 33, 46, 99, **101**
 brevitarsus sp. n. 35, 39, 42, **92, 95**
 brunnea Ritsema 38, 41, 42, 43, **64, 65**
 brunnescens sp. n. 38, 45, **70**
buyssoni Meade-Waldo 76
- claripennis* du Buysson 69
 clypeata Kohl 34, 41, 65, **66, 67, 68**
 colonialis Kohl 35, 44, **48**
- distinguendus* Kohl 64
 dubia Kohl 35, 38, 42, **53, 57**
- elegans* Gerstaecker 72
erythrospilus Cameron 88
 eumenoides de Saussure 47, 109, **110**
- facialis du Buysson 37, 44, 79, **80**
 ferruginea sp. n. 36, **52**
 filiformis (de Saussure) 40, 45, 99, **100**
 filiventris (de Saussure) 36, 42, 74, **75, 79**
 flava sp. n. 36, 74, **75**
fleckii Kohl 72
 freyi du Buysson 39, 44, 68, **69**
fulvipennis de Saussure 87
 fuscata subsp. n. 34, 41, **67**
 fuscipennis du Buysson 39, **86**
- gracilis* Cameron 76
 grisea (F.) 39, 45, **87, 91**
 guerini de Saussure 46, **102, 106**
 guichardi sp. n. 40, 44, **94, 95**
guineensis (F.) 47
- hildebrandti de Saussure 47, **108, 109**
 hirsuta sp. n. 41, **55**
- indica (de Saussure) 31, 35, **58**
- jordani sp. n. 38, **83**
 juncea (F.) 31, 35, 44, **47, 49**
- keiseri sp. n. 46, **104, 106**
 kelnepillautae sp. n. 36, **77**
 kohli Schulz 35, **53, 57**
- lateritia Gerstaecker 36, 37, 44, 68, **72, 74**
 leonhardii du Buysson 36, 43, **87, 91**
 leonina sp. n. 39, 43, **90, 91**
 levior sp. n. 34, 41, **58**
 libera sp. n. 42, **86**
linearis Olivier 71
longestylus du Saussure 103, 108
 longitarsus sp. n. 40, 45, **97, 99**
- macilentata (F.) 36, 37, **81, 84**
 maculata sp. n. 36, **71**
 madecassa (de Saussure) 46, **103, 106**
malagassus (de Saussure) 110
 maromandia sp. n. 47, **108**
massaicus Cameron 53
 meneliki Gribodo 35, 38, 43, **52**
 multipunctata sp. n. 36, **55**
- neavei sp. n. 39, 45, **89**
 nigricans sp. n. 36, **77, 79**
 nigriclava subsp. n. 38, 43, 65, **66**
 nitida sp. n. 40, 57, **60**
- occidentalis* Tullgren 53
ornatus de Saussure 110
- pallens* du Buysson 88
 pennata sp. n. 36, 43, 49, **51**
 petiolata (Degeer) 35, 37, 43, **71, 74**
pictus Kohl 88
 pileata sp. n. 37, 41, **62, 63**
pomicolor de Saussure 110
 prasina de Saussure 47, 106, **107, 109**
 principalis sp. n. 38, **82**
 punctata sp. n. 42, **84**
 punctilla sp. n. 38, **83**

pusillus Kohl 81

pusilloides sp. n. 37, 43, **80**, 84

rothkirchi von Schulthess 42, 45, 84, **85**

rufipennis (Degeer); de Saussure 87

saeva de Saussure 38, 41, **61**, 63

saussurei Kirby 40, 44, **93**, 95

sexmaculatus Cameron 76

somaliensis subsp. n. 40, 46, **100**

somereni sp. n. 35, 44, 49, **50**

tarsata sp. n. 37, 44, **73**, 74

tessmanni von Schulthess 101

tricolor Taschenberg 93

turbulenta Kohl 36, **74**

turgida Kohl 34, 57, **60**

ugandae sp. n. 42, **54**, 57

vasseae du Buysson 35, 41, **56**, 57